


FORM PTO-1390 (REV. 5-93)		U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE ATTORNEY'S DOCKET NUMBER 1607 Rec'd PCT/PTO 05 FEB 2002	
TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371		VO-537 U.S. APPLICATION NO. (If known, see 37 C.F.R. 1.5) <div style="font-size: 1.5em; font-weight: bold; text-align: center;">10/049209</div>	
INTERNATIONAL APPLICATION NO. PCT/EP00/04758	INTERNATIONAL FILING DATE 25 May 2000	PRIORITY DATE CLAIMED 11 November 1999	
TITLE OF INVENTION MILK SUCKING PUMP			
APPLICANT(S) FOR DO/EO/US Claudia KIRCHNER			
<p>Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:</p> <ol style="list-style-type: none"> 1. <input checked="" type="checkbox"/> This is a FIRST submission of items concerning a filing under 35 U.S.C. 371. 2. <input type="checkbox"/> This is a SECOND OR SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371. 3. <input checked="" type="checkbox"/> This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1). 4. <input checked="" type="checkbox"/> A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date. 5. <input checked="" type="checkbox"/> A copy of the International Application as filed (35 U.S.C. 371(c)(2)) <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> is transmitted herewith (required only if not transmitted by the International Bureau). (attached to the oath or declaration) b. <input type="checkbox"/> has been transmitted by the International Bureau. c. <input type="checkbox"/> is not required, as the application was filed in the United States Receiving Office (RO/US). 6. <input checked="" type="checkbox"/> A translation of the International Application into English (35 U.S.C. 371(c)(2)). (verified) 7. <input checked="" type="checkbox"/> Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)) <ol style="list-style-type: none"> a. <input type="checkbox"/> are transmitted herewith (required only if not transmitted by the International Bureau). b. <input type="checkbox"/> have been transmitted by the International Bureau. c. <input type="checkbox"/> have not been made; however, the time limit for making such amendments has NOT expired. d. <input checked="" type="checkbox"/> have not been made and will not be made. 8. <input checked="" type="checkbox"/> A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)). 9. <input checked="" type="checkbox"/> An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)). (3 pages, executed, attached to a copy of the published International Application) 10. <input checked="" type="checkbox"/> A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)). <p>Items 11 to 16. below concern other document(s) or information included:</p> <ol style="list-style-type: none"> 11. <input type="checkbox"/> An Information Disclosure Statement under 37 CFR 1.97 and 1.98. 12. <input checked="" type="checkbox"/> An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included. 13. <input checked="" type="checkbox"/> A FIRST preliminary amendment. (28 pages) <input type="checkbox"/> A SECOND or SUBSEQUENT preliminary amendment. 14. <input checked="" type="checkbox"/> A substitute specification. (attached to a red-ink marked-up version of the English language translation) 15. <input type="checkbox"/> A change of power of attorney and/or address letter. 16. <input checked="" type="checkbox"/> Other items or information: <ul style="list-style-type: none"> - Form PCT/IB/301 - Form PCT/IB/304 - Form PCT/ISA/210 (English language version, 2 pages) - Transmittal of Substitute Specification - Certificate of Mailing by Express Mail (2 pages) - Executed Claim for Small Entity Status document - Return Receipt Postcard 			

U.S. APPLICATION NO. (if known, see 37 CFR 1.5) 10/049209		INTERNATIONAL APPLICATION NO. PCT/EP00/04758		ATTORNEY'S DOCKET NUMBER VO-537	
17. <input checked="" type="checkbox"/> The following fees are submitted: BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)): Search Report has been prepared by the EPO or JPO \$ 890.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) \$ 710.00 No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)) \$ 740.00 Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO \$ 1,040.00 International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4) \$ 100.00				CALCULATIONS PTO USE ONLY	
ENTER APPROPRIATE BASIC FEE AMOUNT =				\$ 890.00	
Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).					
CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	44* - 20 =	24	X \$18.00	\$ 432.00	
Independent claims	1* - 03 =	0	X \$84.00	\$ 0.00	
MULTIPLE DEPENDENT CLAIM(S) (if applicable)			+ \$280.00		
TOTAL OF ABOVE CALCULATIONS =				\$ 1,322.00	
Reduction of 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28)				\$ 661.00	
SUBTOTAL =				\$ 661.00	
Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).				+	
TOTAL NATIONAL FEE =				\$ 661.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property				+	
TOTAL FEES ENCLOSED =				\$ 701.00	
Based upon entry of the First Preliminary Amendment.				Amount to be: refunded	\$
				charged	\$
a. <input checked="" type="checkbox"/> A check in the amount of \$ <u>701.00</u> to cover the above fee is enclosed. b. <input type="checkbox"/> Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees. A duplicate copy of this sheet is enclosed. c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. <u>19-3550</u> . A duplicate copy of this sheet is enclosed.					
NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.					
SEND ALL CORRESPONDENCE TO: Pauley Petersen Kinne & Erickson 2800 West Higgins Road, Suite 365 Hoffman Estates, Illinois 60195 (847) 490-1400 Fax: (847) 490-1403					
				 SIGNATURE Douglas H. Pauley NAME 33,295 REGISTRATION NUMBER	

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Claudia KIRCHNER
Title: MILK SUCKING PUMP
Based Upon: PCT/EP00/04758
Express Mail No.: EL859244954US
Date of Deposit: 05 February 2002

FIRST PRELIMINARY AMENDMENT

Box PCT

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

Please amend the subject Patent Application as follows to place this
Patent Application in better condition for examination:

In the claims, substitute the following Claims 1-23 (Amended) for the
pending Claims 1-23 from the verified English language translation:

1. (Amended) In a breast pump having an attachment (6)
releasably applied to an opening of a container (2) and having a breast attachment
element (6.1), and a manual pump unit (3) which is releasably connected to the
attachment (6) by a connecting sleeve (5.3) or a connecting bore having a cap-shaped
connecting section, and a pump piston (7) which can be moved back and forth in a

Based Upon: PCT/EP00/04758

stroke chamber (5.2) with an actuating handle (4), which is pivotable and has a retracting mechanism (8, 8'), the improvement comprising:

the cap-shaped connecting section and the stroke chamber (5.2) combined in a mutual cap element (5), which is fixed on the attachment (6) by retaining means (5.1, 5.3), and

the retracting mechanism (8) having one side acting on the actuating handle (4) and seated with an other side on the cap element (5).

2. (Amended) In the breast pump in accordance with claim 1, wherein in a completely inserted state of the pump piston (7), a stroke chamber opening (5.4) on a side of the stroke chamber (5.2) facing away from the breast connection element (6.1) is covered by an upper section (4.1) of the actuating handle (4) which in a position of use is located above a pivot axis.

3. (Amended) In the breast pump in accordance with claim 2, wherein the stroke chamber (5.2) in the cap element (5) is curved in an arc-shape in accordance with a movement path of the pump piston (7) which is actuated by an upper section (4.1) of the actuating handle (4).

4. (Amended) In the breast pump in accordance with claim 3, wherein with the container attached, a pivot path of the upper section (4.1) of the actuating handle (4) near a connection to the pump piston (7) is selected so large that in a moved-out state at least an upper edge section of the pump piston (7) is outside of an upper opening edge of the stroke chamber opening (5.4).

5. (Amended) In the breast pump in accordance with claim 4, wherein a retracting mechanism (8) has at least one tension spring, a suspension element (4.3) is positioned on the actuating handle (4), and a further suspension element is positioned on the cap element (5) so that with an inserted piston position a direction of a tensile force lies above a pivot axis of the actuating handle (4) at least until with the container (2) attached the actuating handle (4) reaches a maximum pivot angle in a retraction direction of the pump piston (7), and with the container (2) removed and with a further increased pivot angle the direction of the tensile force is below the pivot axis so that the actuating handle (4) is maintained in an opened position in relation to the cap element (5).

6. (Amended) In the breast pump in accordance with claim 4, wherein the retracting mechanism (8') has at least one pressure spring, a support element (4.7) on an inside of the actuating handle (4) and a support section (5.11) at

Based Upon: PCT/EP00/04758

the cap element (5) are positioned so that at least with a piston rod inserted, a direction of force of pressure lies below the pivot axis of the actuating handle (4).

7. (Amended) In the breast pump in accordance with claim 6, wherein the pressure spring is a spiral spring with a front suspension lug suspended and retained in a support section (5.11) of a free end section of the retaining element (5.1) which is oriented downward when in use and arcs upward in a U-shape in an interior chamber of the cap element (5) and the attachment (6) and is supported with a free end section bent from the suspension lug on a support element (4.7) arranged on an inside of the actuating handle (4).

8. (Amended) In the breast pump in accordance with claim 7, wherein an electric pump is directly connected with a hose to the connecting sleeve (5.3) arranged on the attachment (6) or to the connecting bore.

9. (Amended) In the breast pump in accordance with claim 8, wherein a connecting point between one of the connecting sleeve (5.3) and the connecting bore and the cap element (5) is sealed by one of a conical connection and a seal ring.

10. (Amended) In the breast pump in accordance with claim 9, wherein an opening is provided on the attachment (6) near one of the connecting sleeve (5.3) and the connection bore, which can be closed by one of a stopper and a hand.

11. (Amended) In the breast pump in accordance with claim 10, wherein the retaining means (5.1, 5.3) have a snap-in element (5.1) which snaps together with the attachment (6) when the cap element (5) is coupled to the attachment (6).

12. (Amended) In the breast pump in accordance with claim 11, wherein the snap-in element (5.1) is embodied as a snap-in tongue (5.1) which is oriented toward the container (2) with a free end section which, in the attached state, extends with a snap-in section behind an edge of the attachment (6) facing toward the container (2) when the cap element (5), located opposite the snap-in tongue (5.1), is pushed on one of the connecting sleeve (5.3) and the connecting bore, which are oriented axis-parallel in relation to the container (2).

Based Upon: PCT/EP00/04758

13. (Amended) In the breast pump in accordance with claim 12, wherein an interior of the cap element (5) has one of retaining flaps (5.5) and ribs on both sides which form guide elements when placed on the attachment (6) and securing elements against twisting of the cap element (5) in relation to the attachment (6).

14. (Amended) In the breast pump in accordance with claim 13, wherein seating elements are arranged on both of the lateral sections of the cap element (5) and on both lateral sections of the actuating handle (4) which in a form of separable bearing pin/bearing eye connection form the pivot axis between the actuating handle (4) and the cap element (5).

15. (Amended) In the breast pump in accordance with claim 14, wherein in a rear area remote from the breast attachment element (6.1) the cap element (5) has a rounded top which in the pivoted-in state of the upper section (4.1) of the actuating handle (4) makes a steady transition into the curved exterior of the actuating handle (4).

16. (Amended) In the breast pump in accordance with claim 15, wherein a cross section of the upper section (4.1) and the lower section (4.2) are each outwardly rounded on a rear facing away from the breast attachment element (6.1) and make a steady transition into each other, and an obtuse angle open toward the rear is formed between the upper section (4.1) and the lower section (4.2).

17. (Amended) In the breast pump in accordance with claim 16, wherein an intermediate piece is insertable into a V-shaped gap which when the actuating handle (4) is pivoted is formed in the upper area between the upper section (4.1) and an edge of the stroke chamber opening (5.4), by which a stroke travel of the pump piston (7) is preset to be one of continuous and stepped.

18. (Amended) In the breast pump in accordance with claim 17, wherein spacer cams which contact the upper edge of the container (2) in the attached state are on an inside of a screw connector (6.2) of the attachment (6) for connecting with the container (2) so that an air exchange with an atmosphere is provided in the attached state.

19. (Amended) In the breast pump in accordance with claim 18, wherein the pump piston (7) has a piston rod (7.3) with a backward oriented end section having a releasable hinged connection with the upper section (4.1) of the actuating handle (4).

20. (Amended) In the breast pump in accordance with claim 19, wherein a protrusion made of a soft material is arranged on the interior on a container side of the lower section (4.2) of the actuating handle (4) forming a stop between the actuating handle (4) and the container (2).

21. (Amended) In the breast pump in accordance with claim 20, wherein the manual pump unit (3) and the attachment (6) are arranged so that a weight of each is compensated, and in the empty state with the attachment (6) placed on and the manual pump unit attached (3), the container (2) remains upright.

22. (Amended) In the breast pump in accordance with claim 21, wherein a secondary air regulating unit (9) which can be operated manually from an outside is on the cap element (5) for ventilating a suction chamber which varies during a pump operation.

Based Upon: PCT/EP00/04758

23. (Amended) In the breast pump in accordance with claim 22, wherein the secondary air regulating unit (9) has at least one of a rotatable insert (9.2) and an attachment (9.3) arranged on an exterior of the cap element (5) which when rotated a flow-through conduit which leads through a wall in the cap element (5) into the stroke chamber (5.2) is one of opened and closed.

Please add the following new claims:

24. In the breast pump in accordance with claim 1, wherein the stroke chamber (5.2) in the cap element (5) is curved in an arc-shape in accordance with a movement path of the pump piston (7) which is actuated by an upper section (4.1) of the actuating handle (4).

25. In the breast pump in accordance with claim 1, wherein with the container attached, a pivot path of an upper section (4.1) of the actuating handle (4) near a connection to the pump piston (7) is selected so large that in a moved-out state at least an upper edge section of the pump piston (7) is outside of an upper opening edge of the stroke chamber opening (5.4).

26. In the breast pump in accordance with claim 1, wherein a retracting mechanism (8) has at least one tension spring, a suspension element (4.3) is positioned on the actuating handle (4), and a further suspension element is positioned on the cap element (5) so that with an inserted piston position a direction of a tensile force lies above a pivot axis of the actuating handle (4) at least until with the container (2) attached the actuating handle (4) reaches a maximum pivot angle in a retraction direction of the pump piston (7), and with the container (2) removed and with a further increased pivot angle the direction of the tensile force is below the pivot axis so that the actuating handle (4) is maintained in an opened position in relation to the cap element (5).

27. In the breast pump in accordance with claim 1, wherein a retracting mechanism (8') has at least one pressure spring, a support element (4.7) on an inside of the actuating handle (4) and a support section (5.11) at the cap element (5) are positioned so that at least with a piston rod inserted, a direction of force of pressure lies below the pivot axis of the actuating handle (4).

28. In the breast pump in accordance with claim 27, wherein the pressure spring is a spiral spring with a front suspension lug suspended and retained in a support section (5.11) of a free end section of the retaining element (5.1) which

Based Upon: PCT/EP00/04758

is oriented downward when in use and arcs upward in a U-shape in an interior chamber of the cap element (5) and the attachment (6) and is supported with a free end section bent from the suspension lug on a support element (4.7) arranged on an inside of the actuating handle (4).

29. In the breast pump in accordance with claim 1, wherein an electric pump is directly connected with a hose to the connecting sleeve (5.3) arranged on the attachment (6) or to the connecting bore.

30. In the breast pump in accordance with claim 1, wherein a connecting point between one of the connecting sleeve (5.3) and the connecting bore and the cap element (5) is sealed by one of a conical connection and a seal ring.

31. In the breast pump in accordance with claim 1, wherein an opening is provided on the attachment (6) near one of the connecting sleeve (5.3) and the connection bore, which can be closed by one of a stopper and a hand.

32. In the breast pump in accordance with claim 1, wherein the retaining means (5.1, 5.3) have a snap-in element (5.1) which snaps together with the attachment (6) when the cap element (5) is coupled to the attachment (6).

33. In the breast pump in accordance with claim 32, wherein the snap-in element (5.1) is embodied as a snap-in tongue (5.1) which is oriented toward the container (2) with a free end section which, in the attached state, extends with a snap-in section behind an edge of the attachment (6) facing toward the container (2) when the cap element (5), located opposite the snap-in tongue (5.1), is pushed on one of the connecting sleeve (5.3) and the connecting bore, which are oriented axis-parallel in relation to the container (2).

34. In the breast pump in accordance with claim 1, wherein an interior of the cap element (5) has one of retaining flaps (5.5) and ribs on both sides which form guide elements when placed on the attachment (6) and securing elements against twisting of the cap element (5) in relation to the attachment (6).

35. In the breast pump in accordance with claim 1, wherein seating elements are arranged on both lateral sections of the cap element (5) and on both lateral sections of the actuating handle (4) which in a form of separable bearing pin/bearing eye connection form a pivot axis between the actuating handle (4) and the cap element (5).

36. In the breast pump in accordance with claim 2, wherein in a rear area remote from the breast attachment element (6.1) the cap element (5) has a rounded top which in a pivoted-in state of an upper section (4.1) of the actuating handle (4) makes a steady transition into the curved exterior of the actuating handle (4).

37. In the breast pump in accordance with claim 1, wherein a cross section of an upper section (4.1) and a lower section (4.2) of the actuating handle (4) are each outwardly rounded on a rear facing away from the breast attachment element (6.1) and make a steady transition into each other, and an obtuse angle open toward the rear is formed between the upper section (4.1) and the lower section (4.2).

38. In the breast pump in accordance with claim 1, wherein an intermediate piece is insertable into a V-shaped gap which when the actuating handle (4) is pivoted is formed in an upper area between an upper section (4.1) of the actuating handle (4) and an edge of the stroke chamber opening (5.4), by which a stroke travel of the pump piston (7) is preset to be one of continuous and stepped.

39. In the breast pump in accordance with claim 1, wherein spacer cams which contact an upper edge of the container (2) in an attached state are on an inside of a screw connector (6.2) of the attachment (6) for connecting with the container (2) so that an air exchange with an atmosphere is provided in the attached state.

40. In the breast pump in accordance with claim 1, wherein the pump piston (7) has a piston rod (7.3) with a backward oriented end section having a releasable hinged connection with an upper section (4.1) of the actuating handle (4).

41. In the breast pump in accordance with claim 1, wherein a protrusion made of a soft material is arranged on the interior on a container side of a lower section (4.2) of the actuating handle (4) forming a stop between the actuating handle (4) and the container (2).

42. In the breast pump in accordance with claim 1, wherein the manual pump unit (3) and the attachment (6) are arranged so that a weight of each is compensated, and in an empty state with the attachment (6) placed on and the manual pump unit attached (3), the container (2) remains upright.

Based Upon: PCT/EP00/04758

43. In the breast pump in accordance with claim 1, wherein a secondary air regulating unit (9) which can be operated manually from an outside is on the cap element (5) for ventilating a suction chamber which varies during a pump operation.

44. In the breast pump in accordance with claim 43, wherein the secondary air regulating unit (9) has at least one of a rotatable insert (9.2) and an attachment (9.3) arranged on an exterior of the cap element (5) which when rotated a flow-through conduit which leads through a wall in the cap element (5) into the stroke chamber (5.2) is one of opened and closed.

On a separate page, please add the following: **ABSTRACT OF THE DISCLOSURE.**

Based Upon: PCT/EP00/04758

ABSTRACT OF THE DISCLOSURE

A milk sucking pump having a top component with a breast joining piece and which is or can be detachably fixed to the opening of a container and a hand pump unit that is detachably connected thereto by a connecting branch or a connecting bore. The hand pump unit has a cap-like connection section and a pump piston which can be moved to and from in a piston-swept volume by a rotatable actuating handle that has a return mechanism. This invention provides a simple construction and good handling. The cap-like connection section and the piston-swept volume are combined to form a uniform cap component which is fixed to the top component. The return mechanism acts upon the actuating lever and is mounted on the cap component.

Based Upon: PCT/EP00/04758

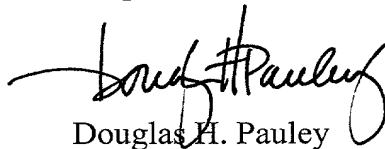
REMARKS

Applicant respectfully requests entry of the above Preliminary Amendment to place this Patent Application in better form for examination and prosecution before the U.S. Patent and Trademark Office.

The claims have been amended to eliminate multiple dependent claims and to more definitely and fully claim the subject matter of Applicant's invention. Applicant urges that the above Preliminary Amendment introduces no new matter into this Patent Application.

Applicant sincerely believes that this Patent Application is now in condition for examination and prosecution before the U.S. Patent and Trademark Office.

Respectfully submitted,



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) [A] In a breast pump [with] having an attachment (6)[, which is or can be] releasably applied to [the] an opening of a container (2) and having [has] a breast attachment element (6.1), and [with] a manual pump unit (3)[,] which is releasably connected to the attachment (6) by [means of] a connecting sleeve (5.3) or a connecting bore[, which has] having a cap-shaped connecting section, [as well as] and a pump piston (7)[,] which can be moved back and forth in a stroke chamber (5.2) [by means of] with an actuating handle (4), which is pivotable and [provided with] has a retracting mechanism (8, 8'), the improvement comprising:

[characterized in that]

the cap-shaped connecting section and the stroke chamber (5.2) [are] combined in a mutual cap element (5), which is fixed on the attachment [(5)] (6) by retaining means (5.1, 5.3), and

the retracting mechanism (8)[,] having one side [of which acts] acting on the actuating handle (4)[, is] and seated with [the] an other side on the cap element (5).

Based Upon: PCT/EP00/04758

2. (Amended) [The] In the breast pump in accordance with claim 1, wherein

[characterized in that,]

in [the] a completely inserted state of the pump piston (7), a stroke chamber opening (5.4) on [the] a side of the stroke chamber (5.2) facing away from the breast connection element (6.1) is covered by an upper section (4.1) of the actuating handle (4) which[,] in [the] a position of use[,] is located above a pivot axis.

3. (Amended) [The] In the breast pump in accordance with claim [1 or] 2, wherein

[characterized in that]

the stroke chamber (5.2) in the cap element (5) is curved in an arc-shape in accordance with a movement path of the pump piston (7)[,] which is actuated by [the] an upper section (4.1) of the actuating handle (4).

4. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that,] claim 3, wherein

with the container attached, a pivot path of the upper section (4.1) of the actuating handle (4) [in the area of its] near a connection to the pump piston (7) [has

Based Upon: PCT/EP00/04758

been] is selected [to be] so large that[, in [the] a moved-out state[, at least an upper edge section of the pump piston (7) is outside of an upper opening edge of the stroke chamber opening (5.4).

5. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 4, wherein a

[the] retracting mechanism (8) has at least one tension spring,

a suspension element (4.3) is positioned on the actuating handle (4), and a further suspension element is positioned on the cap element (5)[, in such a way,] so that with [the] an inserted piston position[, the] a direction of a [the] tensile force lies above [the] a pivot axis of the actuating handle (4)[, at least until[, with the container (2) attached[, the actuating handle (4) reaches [its] a maximum pivot angle in [the] a retraction direction of the pump piston (7), and

with the container (2) removed and with a further increased pivot angle the direction of the tensile force [lies] is below the pivot axis[, so that the actuating handle (4) is [kept] maintained in [the] an opened position in relation to the cap element (5).

Based Upon: PCT/EP00/04758

6. (Amended) [The] In the breast pump in accordance with claim
[one of claims 1 to] 4,

[characterized in that] wherein

the retracting mechanism (8') has at least one pressure spring,

a support element (4.7) on [the] an inside of the actuating handle (4) and
a support section (5.11) at the cap element (5) are positioned [in such a way] so that[,]
at least with [the] a piston rod inserted, [the] a direction of [the] force of pressure lies
below the pivot axis of the actuating handle (4).

7. (Amended) [The] In the breast pump in accordance with claim
6, wherein

[characterized in that]

the pressure spring is [embodied as] a spiral spring[, whose] with a front
suspension lug [is] suspended and retained in a support section (5.11) of a free end
section of the retaining element (5.1)[,] which is oriented downward when in use[,]
and arcs upward in a U-shape in an interior chamber of the cap element (5) and the
[grip] attachment (6) and is supported with a free end section bent [off] from the
suspension lug on a support element (4.7) arranged on [the] an inside of the actuating
handle (4).

Based Upon: PCT/EP00/04758

8. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 7, wherein

an electric pump [can be] is directly connected [by means of] with a hose to the connecting sleeve (5.3) arranged on the attachment (6) or to the connecting bore.

9. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that

the] claim 8, wherein a connecting point between one of the connecting sleeve (5.3) [or] and the connecting bore and the cap element (5) is sealed by [means] one of a conical connection [or of] and a seal ring.

10. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 9, wherein

an opening is provided on the attachment (6) [in the area of] near one of the connecting sleeve (5.3) [or] and the connection bore, which can be closed by [means] one of a stopper [or, when the stopper has been removed, by] and a hand.

Based Upon: PCT/EP00/04758

11. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 10, wherein

the retaining means (5.1, 5.3) have a snap-in element (5.1) which snaps together with the attachment (6)[,] when the cap element (5) [has been] is coupled to the attachment (6).

12. (Amended) [The] In the breast pump in accordance with claim 11, wherein

[characterized in that]

the snap-in element (5.1) is embodied as a snap-in tongue (5.1)[,] which is oriented toward the container (2) with a free end section which, in the attached state, extends with a snap-in section behind an edge of the attachment (6) facing toward the container (2) when the cap element (5), located opposite the snap-in tongue (5.1), [has been] is pushed on one of the connecting sleeve (5.3) [or] and the connecting bore, which are oriented axis-parallel in relation to the container (2).

Based Upon: PCT/EP00/04758

13. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that

on its] claim 12, wherein an interior of the cap element (5) has one of retaining flaps (5.5) [or] and ribs on both sides[,] which [constitute] form guide elements when [it is] placed on the attachment (6) and securing elements against twisting of the cap element (5) in relation to the attachment (6).

14. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 13, wherein

seating elements are arranged on both of the lateral sections of the cap element (5) [on the one hand] and[, on the other hand] on both lateral sections of the actuating handle (4) which[,] in [the] a form of separable bearing pin/bearing eye connection[, constitute] form the pivot axis between the actuating handle (4) and the cap element (5).

Based Upon: PCT/EP00/04758

15. (Amended) [The] In the breast pump in accordance with [one of claims 2 to 14,

characterized in that] claim 14, wherein

in [the] a rear area remote from the breast attachment element (6.1) the cap element (5) has a rounded top which[,] in the pivoted-in state of the upper section (4.1) of the actuating handle (4)[,] makes a steady transition into the [also] curved exterior of the [latter] actuating handle (4).

16. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 15, wherein a

[in] cross section of the upper section (4.1) and the lower section (4.2) are each outwardly rounded on [their] a rear facing away from the breast attachment element (6.1) and make a steady transition into each other, [wherein] and an obtuse angle[,] open toward the rear[,] is formed between the upper section (4.1) and the lower section (4.2).

Based Upon: PCT/EP00/04758

17. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 16, wherein

an intermediate piece is [provided, which can be inserted] insertable into a V-shaped gap which[,] when the actuating handle (4) is pivoted[,] is formed in the upper area between [its] the upper section (4.1) and [the] an edge of the stroke chamber opening (5.4), by [means of] which a [the] stroke travel of the pump piston (7) [can be] is preset to be one of continuous [or] and stepped.

18. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 17, wherein

spacer cams[,] which [come into] contact [with] the upper edge of the container (2) in the attached state[,] are [provided] on [the] an inside of a screw connector (6.2) of the attachment (6) for connecting [it] with the container [(6),] (2) so that an air exchange with an [the] atmosphere is provided in the attached state.

Based Upon: PCT/EP00/04758

19. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 18, wherein

the pump piston (7) has a piston rod (7.3) [formed on it centered or eccentric, on whose] with a backward oriented end section having a releasable hinged connection with the upper section (4.1) of the actuating handle (4) [is provided].

20. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 19, wherein

a protrusion made of a soft material is arranged on the interior[,] on [the] a container side[,] of the lower section (4.2) of the actuating handle (4) [for] forming a stop between the actuating handle (4) and the container (2).

21. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 20, wherein

the manual pump unit (3) and the attachment (6) are arranged [in such a way, and their] so that a weight of each is compensated, [that] and in the empty state

Based Upon: PCT/EP00/04758

[and] with the attachment (6) placed on [it] and the manual pump unit attached (3), the container (2) remains upright.

22. (Amended) [The] In the breast pump in accordance with [one of the preceding claims,

characterized in that] claim 21, wherein

a secondary air regulating unit (9)[,] which can be operated manually from [the] an outside[,], is [provided] on the cap element (5) for ventilating [the] a suction chamber[,], which varies during [the] a pump operation.

23. (Amended) [The] In the breast pump in accordance with claim 22, wherein

[characterized in that]

the secondary air regulating unit (9) [is provided with] has at least one of a rotatable insert (9.2) [and/or] and an attachment (9.3) arranged on [the] an exterior of the cap element (5) which when rotated [, by means of whose rotation] a flow-through conduit[,], which leads through a wall in the cap element (5) into the stroke chamber (5.2)[,], is one of opened [to a greater or lesser extent, or can be completely] and closed.

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JOE MARRAS 05 FEB 2002

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SUBSTITUTE SPECIFICATION

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Based Upon: PCT/EP00/04758

MILK SUCKING PUMP

Based Upon: PCT/EP00/04758

BACKGROUND OF THE INVENTION

Field of the Invention

This invention relates to a breast pump with an attachment, which can be releasably applied to the opening of a container and has a breast attachment element, and with a manual pump unit, which is releasably connected to the attachment by a connecting sleeve or a connecting bore, which has a cap-shaped connecting section, as well as a pump piston, which can be moved back and forth in a stroke chamber by an actuating handle that is pivotable and has a retracting mechanism.

Description of Related Art

A known breast pump with a manual pump unit is disclosed in German Patent Reference DE 87 14 995 U1. With this known breast pump, an attachment with a funnel-shaped breast attachment element and with a pump connector is releasably screwed to a container. A cap-shaped section of the manual pump unit is placed on the pump connecting element. A pump cylinder with a guided pump piston in an interior is attached, horizontally projecting to the rear, to the cap-like section. The pump piston is moved back and forth with a lever-shaped actuating handle wherein, for returning the pump piston, the handle is supported by a U-shaped spring on a support fastened underneath the pump cylinder which extends as far as the underside of the container. The construction of the manual pump unit is relatively bulky and cumbersome, so that there is one disadvantage in manipulating it.

In another breast pump represented in European Patent Reference EP 0 330 845 A2, a manual pump unit has a manual actuating element, which axially extends out of the pump cylinder toward the rear and is moved by one hand in an axial direction, while the breast pump is held with other hand. Thus, both hands are required for manipulation.

A pump cylinder of a breast pump is shown in European Patent Reference EP 0 385 933 A2 is oriented obliquely upward. A pump piston, guided in its interior, is actuated by two actuating elements, which are conducted laterally along the pump cylinder, and by a transverse strip, which is hingedly fastened on the actuating elements above the pump cylinder and moves upward when the actuating element is pressed together at the center, and downward, when it is released, in order to move the pump piston back and forth. The actuating unit and the pump piston can be replaced by an electrical pump, which is connected by a cover, which can be placed on the top of the pump cylinder.

SUMMARY OF THE INVENTION

One object of this invention is to provide a breast pump of the type mentioned above but which has improved manipulation along with a simplified construction.

This object is achieved with a pump having characteristics described in this specification and in the claims. A cap-shaped connecting section and a stroke chamber are combined in a mutual cap element, which is fixed on an attachment by

a retaining device. A retracting mechanism, one side of which acts on the actuating handle, is seated with the other side on the cap element.

Simple cleaning and manipulation are possible because in the completely inserted state of the pump piston, a stroke chamber opening on the side of the stroke chamber facing away from the breast connection element is covered by an upper section of the actuating handle which, in the position of use, is located above a pivot axis.

An easy movement of the piston and the connected actuation elements, which is free of wear to a considerable extent over time, is achieved because the stroke chamber in the cap element is curved in an arc-shape according to a movement path of the pump piston, which is actuated by an upper section of the actuating handle.

The entry of air into the piston chamber and the pumping output are assisted because with the container attached, a pivot path of the upper section of the actuating handle in the area of its connection to the pump piston is selected to be so large that, in the moved-out state, at least an upper edge section of the pump piston is outside of an upper opening edge of the stroke chamber opening. In a similar manner it is possible to cut, for example, a groove, or a bore, or the like, into the piston wall.

A simple, well functioning retracting mechanism is created and cleaning is easier because the retracting mechanism has at least one tension spring and a suspension element is positioned on the actuating handle. A further suspension

element is positioned on the cap element so that with the piston in the inserted position, the direction of the tensile force lies above the pivot axis of the actuating handle, at least until, with the container attached, the actuating handle reaches its maximum pivot angle in the retraction direction of the pump piston. With the container removed and with a further increased pivot angle the direction of the tensile force lies below the pivot axis, so that the actuating handle is maintained in the opened position relative to the cap element.

In one embodiment of a well functioning, simple retracting mechanism, the retracting mechanism has at least one pressure spring. A support element on the inside of the actuating handle and a support section at the cap element are positioned so that, at least with the piston rod inserted, the direction of the force of pressure lies below the pivot axis of the actuating handle. A rubber block, a spiral spring or a spring, for example, can be used.

A restoring force which remains stable over time is achieved because the pressure spring is embodied as a spiral spring with front suspension lug suspended and retained in a support section of a free end section of the retaining element, which is oriented downward when in use, and arcs upward in a U-shape in an interior chamber of the cap element and the grip and is supported with a free end section bent off from the suspension lug on a support element arranged on the inside of the actuating handle. In this embodiment the support section and the support element are formed on the retaining element, or on the actuating handle. The spiral spring, which

Based Upon: PCT/EP00/04758

for example is made of steel, is thermally stable and can be boiled clean. The spiral spring can be simply mounted and can be easily housed so it is invisible.

The manual pump unit can be easily replaced by an electric pump directly connected by a hose to the connecting sleeve arranged on the attachment or to the connecting bore.

Simple sealing, which promotes a good pumping output, is achieved with the connecting point between the connecting sleeve or the connecting bore and the cap element sealed by a conical connection or of a seal ring.

During electrical operation, if the electric pump does not have automatic ventilation, ventilation can be manually regulated. An opening is provided on the attachment in the area of the connecting sleeve or the connection bore, which can be closed by a stopper or, when the stopper is removed, can be closed by hand.

A simple, releasable coupling between the attachment and the manual pump unit is achieved because the retaining means have a snap-in element which snaps together with the attachment, when the cap element is coupled to the attachment. Design and operation are simplified. The snap-in element is embodied as a snap-in tongue, oriented toward the container with a free end section and which, in the attached state, extends with a snap-in section behind an edge of the attachment facing toward the container when the cap element, located opposite the snap-in tongue, is pushed on the connecting sleeve or the connecting bore oriented axis-parallel in relation to the container.

Operation is easier because on its interior the cap element has retaining flaps or ribs on both sides, which form guide elements when placed on the attachment and securing elements against twisting of the cap element in relation to the attachment.

Because seating elements are arranged on both lateral sections of the cap element and on both lateral sections of the actuating handle which, in the form of separable bearing pin/bearing eye connection, form the pivot axis between the actuating handle and the cap element, there is simple construction and simple operation.

A shape of the manual pump unit which is advantageous for cleaning and handling, has in the rear area remote from the breast attachment element a cap element with a rounded top which, in the pivoted-in state of the upper section of the actuating handle, makes a steady transition into the curved exterior of the latter.

The operation of the manual pump is easier because in cross section the upper section and the lower section are outwardly rounded on a rear side facing away from the breast attachment element and make a steady transition into each other. An obtuse angle, open toward the rear, is formed between the upper section and the lower section.

A simple change of the pump output is achieved because there is an intermediate piece which can be inserted into a V-shaped gap which, when the actuating handle is pivoted, is formed in the upper area between the upper section of

the actuating handle and the edge of the stroke chamber opening. Thus the stroke travel of the pump piston can be preset to be continuous or stepped.

The spacer cams, which contact the upper edge of the container in the attached state, are on the inside of a screw connector of the attachment for connecting it with the container. An air exchange with the atmosphere is provided in the attached state, and the ventilation of the container is assured when the attachment is screwed on the container.

To attach the pump piston in a simple manner, the pump piston has a piston rod formed on the pump piston, centered or eccentric, on which backward oriented end section a releasable hinged connection with the upper section of the actuating handle is provided.

If a protrusion made of a soft material is arranged on the interior, on the container side, of the lower section of the actuating handle for forming a stop between the actuating handle and the container, the hard contact of the actuating handle with the container wall is prevented. Here, the stop can also be designed for changing the pivot path for actuating the pump piston.

There is good handling because the manual pump unit and the attachment are arranged so their weight is compensated. In an empty state and with the attachment placed on it and the manual pump unit attached, the container remains upright.

The interior of the breast pump can be variably ventilated by a secondary air regulating unit, which can be operated manually from the outside, on the cap element for ventilating the suction chamber, which varies during the pump operation.

There is a simple construction and easy manipulation because the secondary air regulating unit has a rotatable insert and/or attachment arranged on the exterior of the cap element, by which rotation a flow-through conduit, which leads through a wall in the cap element into the stroke chamber, is opened to a greater or lesser extent, or can be completely closed. In this case the setting preferably is continuous and can be reproduced, for example, with markings which can be felt. A vacuum is automatically reduced when the flow-through conduit is open, and the degree of the vacuum is individually selected. It is advantageous for health care reasons, if it is produced from silicon.

BRIEF DESCRIPTION OF THE DRAWINGS

This invention is explained in greater detail in view of an exemplary embodiment, wherein the drawings show:

Figs. 1A to 1E as views of a breast pump with a container from the front, the rear, above, and in a perspective representation;

Figs. 2A to 2E as views of a manual pump unit employed with the breast pump in a side view, a rear view, a front view, a top view, and in a perspective representation;

Figs. 3A to 3F as views of an actuating handle employed with the breast pump from a front, a right side, a left side, a rear, a bottom and a top;

Figs. 4A to 4F as views of a cap element employed with the breast pump from a side, a rear, a front, a bottom, a top and in a perspective view;

Figs. 5A to 5E as views of a pump piston employed with the breast pump in a perspective, a top, a side, a rear, and a front;

Figs. 6A to 6E as views of a further manual pump unit, in which a different retracting mechanism and a secondary air regulating unit are provided in contrast to the previous exemplary embodiments; and

Figs. 7A and 7B as views of a cross section through the manual pump unit in accordance with Figs. 6A, 6D and 6E in a bottom view, or in a detailed view.

DESCRIPTION OF PREFERRED EMBODIMENTS

As shown in Fig. 1, the breast pump 1 has a container 2 for receiving pumped out milk, an attachment 6 screwed on the container 2, a manual pump unit 3 releasably attached to the latter, having an actuating handle 4 and a cap element 5, releasably connected with the cap element 5.

The attachment 6 is screwed by means of a screw connector 6.2 to a collar section of the container 2, which surrounds the container opening. A breast attachment element 6.1 is connected in a known manner to a cover section of the screw connector 6.2, wherein a flow-through valve is arranged approximately in the

area of the cover element, through which the pumped milk reaches the container 2 and is prevented from exiting the container 2, or cannot be aspirated back.

On the attachment 6, the manual pump unit 3 with the cap element 5 is tightly placed on a connecting element in the form of a sleeve which projects upward parallel with the container axis and has an appropriately matched coupling element 5.3, which is sealed, for example, by means of a cone seal or an additional sealing element and is shown in Figs. 2C, 4C and 4D. The coupling element 5.3 is formed on the inside of the upper wall of the cap element 5, extending downward, and makes a transition into a connecting conduit 5.7, which terminates in a stroke chamber also formed in the cap element 5, as shown in Fig. 4B. A retaining element 5.1 in the form of a snap-in tongue projects from the underside of the cap element 5, which snaps into a snap-in shoulder at the lower edge of the screw connector 5.2, wherein the snap-in tongue is displaced against its spring force by means of a snap-in ramp at the end, when the cap element 5 is attached.

The stroke chamber 5.2 is arranged in the rear section of the cap element 5 facing away from the attachment element 6.1 and has a stroke chamber opening 5.4 on its rear, while it is closed off toward the front with a front face 5.9. The stroke chamber 5.2 is designed to be curved in accordance with the movement path of a pump piston 7, which is moved back and forth therein with the actuating handle 4. Retaining flaps, or retaining strips 5.5 of a retaining element which is U-shaped in cross section, are provided on the underside of the cap element 5 at the side, and have

in their lower area near the free end bearing eyes 5.6 for the insertion of correspondingly designed bearing pins 4.4 of the actuating handle 4 in order to make a releasable, hinged connection of the actuating handle 4 on the cap element 5. Strips extending essentially parallel with the container axis, are formed on both sides of the interior of the front section of the cap element 5, as well as suspension elements 5.8, in which retracting springs 8, for example rubber rings, are suspended, in order to bring, by means of a spring force, the actuating handle 4 attached to the cap element 5 after its deflection back into the initial position, in which the pump piston 7 is introduced into the stroke chamber 5.2, as shown in Fig. 2A. Corresponding further suspension elements 4.3 are attached to strips 4.5 on the inside of the actuating handle 4. The strips 4.5 also support the bearing pins 4.4, as shown in Figs. 2C, 3A, 3E and 3F.

With its upper section 4.1, which is located above the hinge axis, the actuating handle 4 makes a steadily curving transition at the top and the sides into the curves of the cap element 5. In the completely inserted position of the pump piston 7, it closes the stroke chamber 5.4, as shown in Figs. 1A and 2A. A lower section 4.2, oriented backward at an obtuse angle, which in cross section is also convexly curved outward, follows the upper section 4.1 of the actuating handle 4 approximately in the area of the pivot axis, so that satisfactory manipulation of the lower handle section 4.2 for performing a pumping operation results. The lower section 4.2 rests against the ball of the thumb, and in the transition area between the upper section 4.1 and the

lower section 4.2, the thumb and index finger, pointing forward, can grasp the upper container section. A connecting element 4.6 is formed on the inside of the upper section 4.1 for providing a connection with a piston rod 4.3 of the pump piston 7. As shown in Figs. 5A to 5D, the piston rod 4.3 is formed on a retainer plate 7.2, which forms a part of a piston plate 7.1 with lateral sealing edges. A soft spacer element, not shown, can be provided on the inside in the lower section 4.2 of the actuating handle, so that during actuation the lower section 4.2 gently touches the outside of the container 2, and so that a limitation of the stroke travel of the pump piston 7 can thus be set. Moreover, an intermediate piece, not shown, can be provided for limiting the stroke travel and therefore the pumping effect which, during the pivoting out of the upper section 4.1 of the actuating handle 4, can be inserted between the edge of the stroke chamber opening 5.4 and the upper section 4.1. An opening, which can be selectively released and can be closed by means of a stopper, can be provided on the back of the attachment 2 for manual ventilation when an electric pump is attached to the connecting sleeve.

Figs. 6A to 6E, 7A, and 7B show a further embodiment of the breast pump 1, wherein the manual pump unit 3 has a secondary air regulating unit 9 and a retracting mechanism 8', which is an alternative to the previous exemplary embodiments. Otherwise the design essentially corresponds to that of the previous embodiment, wherein the reference numerals relate to corresponding parts of the breast pump 1.

The retracting mechanism shown in Figs. 6A and 6C has a spiral spring 8', which is essentially bent into a U-shape, wherein the end of one front leg is angled off to form a suspension lug, while the other leg terminates in an outwardly bent end section. The suspension lug is fixed in a cutout formed in the lower end section, in the position of use, of the retaining element 5.1 in the shape of a support section 5.11, which is formed during the manufacturing process. The other leg end is inserted and supported in a support element 4.7 formed on the inside of the actuating handle 4. The spiral spring can be easily mounted and removed, for example while disassembling the cap element 5 and the actuating handle 4. The spiral spring is preferably embodied as a steel spring and maintains its spring properties permanently and can also be cleaned by boiling. In the installed state it projects with the U-shaped arch upward into a hollow space formed between the cap element 5 and the actuating handle 4, so that it is housed in a hidden manner.

As shown in Figs. 6A, 6B, 6E, 6D, 7A, and 7B, the secondary air regulating unit 9 is arranged laterally on the exterior of the wall of the cap element 5. It has an inlet section 9.1, which is formed in the cap element 5 and slightly projects outward, in which a central receiving pin for an insert 9.2, which can be attached from the outside, as well as a flow-through conduit 9.11, which terminates in the stroke chamber 5.2 in the vicinity of the front wall 5.9, are provided, as shown in Figs. 7A and 7B. An opening 9.21 is formed in the insert 9.2, which is aligned or can be aligned with the flow-through conduit 9.11. The inlet section 9.1 and the insert 9.2

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are covered by a removable cover 9.3, preferably made of silicon, wherein a slot 9.31 can be more or less aligned with the opening 9.21. The opening 9.21 terminates in a laterally widened section, so that the amount of the covering of the conduit leading outward from the stroke chamber 5.2 can be easily varied within a wide range by an appropriate rotation of the cover 9.3. For simple actuation, the cover 9.3 has grip elements, which project rib-like from the circumference, one of which is thickened for marking a position of rotation. As shown in Fig. 7B, a lip-like edge of the cover 9.3 extends below an outward projecting circumferential collar of the inlet section 9.1, so that satisfactory retention and sealing of the cover 9.3 result.

The secondary air regulation unit 9 provides a continuous, reproducible regulating possibility for air conducted into the suction chamber of the breast pump. A built-up vacuum is automatically reduced by means of the secondary air opening being opened to a greater or lesser extent, and the size of the vacuum can be individually selected. Automatically intermittent pumping can be performed.

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BACKGROUND OF THE INVENTION
Field of the Invention

WO 01/34226

PCT/EP00/04758

Milk Sucking Pump

Description of Related Art

^{This}
[The] invention relates to a breast pump with an attachment, which ^{is or} can be releasably applied to the opening of a container and has a breast attachment element, and with a manual pump unit, which is releasably connected to the attachment by ^{means of} a connecting sleeve or a connecting bore, which has a cap-shaped connecting section, as well as a pump piston, which can be moved back and forth in a stroke chamber by ^{means of} an actuating handle, which ^{that} is pivotable and ^{has} provided with a retracting mechanism.

^{A known}
[Such a] breast pump with a manual pump unit is disclosed in ^{German Patent Reference} DE 87 14 995 U1. With this known breast pump, an attachment with a funnel-shaped breast attachment element and with a pump connector is releasably screwed to a container. A cap-shaped section of the manual pump unit is placed on the pump connecting element. A pump cylinder with a ^{guided} pump piston ^{guided} in ^{its} ^{an} interior is attached, horizontally projecting to the rear, to the cap-like section. The pump piston is moved back and forth with ^{the aid of} a lever-shaped actuating handle wherein, for returning the pump piston, the handle is supported by ^{means of} a U-shaped spring on a support fastened underneath the pump cylinder which extends as far as the underside of the container. The construction of the manual pump unit is relatively bulky and cumbersome, so that ^{there is one} ^{disadvantages} can also result ⁱⁿ ^{the course of} manipulating it.

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In ^{European Patent Reference} [connection with] another breast pump represented in EP 0 330 845 A2, a manual pump unit has a manual actuating element, which axially extends out of the pump cylinder toward the rear and is moved by one hand in ^{an} [the] axial direction, while the breast pump is held with other hand. Thus, both hands are required for manipulation.

A pump cylinder of a breast pump ^{is} shown in ^{European Patent Reference} EP 0 385 933 A2 is oriented obliquely upward. A pump piston, [which is] guided in its interior, is actuated by [means of] two actuating elements, which are conducted laterally along the pump cylinder, and by a transverse strip, which is hingedly fastened on the actuating elements above the pump cylinder and moves upward when the actuating element is pressed together at the center, and downward, when it is released, in order to move the pump piston back and forth. The actuating unit ^{and} [with] the pump piston can be replaced by an electrical pump, which is connected by [means of] a cover, which can be placed on the top of the pump cylinder.

SUMMARY OF THE INVENTION ^{to provide}
 [The] ^{One this} object of [the] invention is [based on making available] a breast pump of the type mentioned [at the outset], ^{above but} which [provides] has improved manipulation along with a simplified construction.

This object is ^{achieved with a pump having} [attained by means of the] characteristics [of claim 1]. ^{described in this specification and in the claims} [In accordance therewith it is provided that the] ^A cap-shaped connecting section and [the] ^a stroke chamber are combined in a mutual cap element, which is fixed on [the] ^{an} attachment by ^a retaining

device. A

[means, and that the] retracting mechanism, one side of which acts on the actuating handle, is seated with the other side on the cap element.

Simple cleaning and manipulation are ^{possible because in} [assisted in that, in] the completely inserted state of the pump piston, a stroke chamber opening on the side of the stroke chamber facing away from the breast connection element is covered by an upper section of the actuating handle which, in the position of use, is located above a pivot axis.

An easy movement of the piston and the connected actuation elements, which is free of wear to a considerable extent over time, is achieved [in that] ^{because} the stroke chamber in the cap element is curved in an arc-shape [in accordance with] ^{according to} a movement path of the pump piston, which is actuated by ^{an} [the] upper section of the actuating handle.

The entry of air into the piston chamber and the pumping ^{output} [effect] are [aided in that,] ^{assisted because} with the container attached, a pivot path of the upper section of the actuating handle in the area of its connection to the pump piston [has been] ^{is} selected to be so large that, in the moved-out state, at least an upper edge section of the pump piston is outside of an upper opening edge of the stroke chamber opening. In a similar manner it [would be] ^{is} possible to cut, for example, a groove, or a bore, or the like, into the piston wall.

A simple, well functioning retracting mechanism is created and cleaning is [made] easier [by means of the steps, wherein] ^{because} the retracting mechanism has at least one tension spring[,] and [that] a suspension element is positioned on the actuating handle[,] and a ^A further suspension element ^{is positioned} on the cap element[,] in such a way, ^{so} that with the piston in the inserted position, the direction of the tensile force lies above the pivot axis of the actuating handle, at least until, with the container attached, the actuating handle reaches its maximum pivot angle in the retraction direction of the pump piston[,] and that with ^{with} the container removed and with a further increased pivot angle the direction of the tensile force lies below the pivot axis, so that the actuating handle is [kept] ^{maintained} in the opened position [in relation] ^{relative} to the cap element.

[An alternative] ^{In one} embodiment of a well functioning, simple retracting mechanism, [consists in that] the retracting mechanism has at least one pressure spring[,] that a ^A support element on the inside of the actuating handle and a support section at the cap element are positioned [in such a way] ^{so} that, at least with the piston rod inserted, the direction of the force of pressure lies below the pivot axis of the actuating handle. A rubber block, a spiral spring or a [spiral] spring, for example, can be [employed here] ^{used}.

A restoring force which remains stable over time is achieved [here with simple means in that] ^{because} the pressure spring is embodied as a spiral spring[, whose] ^{with} front suspension lug [is] suspended and

retained in a support section of a free end section of the retaining element, which is oriented downward when in use, ^{and} arcs upward in a U-shape in an interior chamber of the cap element and the grip and is supported with a free end section bent off from the suspension lug on a support element arranged on the inside of the actuating handle. In this ^{embodiment} [case] the support section and the support element ^{are} [can be] formed on the retaining element, or ^{on} the actuating handle. The spiral spring, which for example is made of steel, is thermally stable and can be [cleaned by being] boiled. ^{clean} [It] can be simply mounted and can be easily housed so it is invisible. ^{The spiral spring}

The manual pump unit can be easily replaced by an electric pump [in that an electric pump can be] directly connected by [means of] a hose to the connecting sleeve arranged on the attachment or to the connecting bore.

Simple sealing, which ^{promotes} [aids] a good pumping [effect], ^{output} is achieved [in that] ^{with} the connecting point between the connecting sleeve or the connecting bore and the cap element [is] sealed by [means of] a conical connection or of a seal ring.

During electrical operation, if the electric pump does not have automatic ventilation, ventilation can be manually regulated [by {means of} the steps that an] ^{An} opening is provided on the attachment in the area of the connecting sleeve or the connection bore, which can be closed by [means of] a stopper or, when the stopper [has been] ^{is} removed, ^{can be closed} by hand.

A simple, releasable coupling between the attachment and the manual pump unit is achieved [in that] ^{because} the retaining means have a snap-in element which snaps together with the attachment, when the cap element [has been] ^{is} coupled to the attachment. Design and operation are ^{simplified. The} [in this case made easier by the steps in that the] snap-in element is embodied as a snap-in tongue, [which is] oriented toward the container with a free end section and which, in the attached state, extends with a snap-in section behind an edge of the attachment facing toward the container when the cap element, located opposite the snap-in tongue, [has been] ^{is} pushed on the connecting sleeve or the connecting bore [which are] oriented axis-parallel in relation to the container.

Operation is [furthermore made] easier [in that] ^{because} on its interior the cap element has retaining flaps or ribs on both sides, which [constitute] ^{form} guide elements when [it is] placed on the attachment and securing elements against twisting of the cap element in relation to the attachment.

[The fact that] ^{Because} seating elements are arranged on both lateral sections of the cap element [on the one hand] and [on the other hand] on both lateral sections of the actuating handle which, in the form of separable bearing pin/bearing eye connection, [constitute] ^{form} the pivot axis between the actuating handle and the cap element, [adds to the] ^{there is} simple construction and simple operation.

A shape of the manual pump unit which is advantageous [in respect to] ^{for} cleaning and handling, [consists in that] ^{has} in the rear area remote from the breast attachment element [the] ^a cap element [has] ^{with} a rounded top which, in the pivoted-in state of the upper section of the actuating handle, makes a steady transition into the [also] curved exterior of the latter.

The operation of the manual pump is [made] easier [in that] ^{because} in cross section the upper section and the lower section are outwardly rounded on [their] ^a rear ^{side} facing away from the breast attachment element and make a steady transition into each other [wherein an] ^{An} obtuse angle, open toward the rear, is formed between the upper section and the lower section.

A simple change of the pump output is achieved [in that] ^{because there is} an intermediate piece [is provided,] which can be inserted into a V-shaped gap which, when the actuating handle is pivoted, is formed in the upper area between the upper section of the ^{actuating handle} [latter] and the edge of the stroke chamber opening [and by means of which] ^{Thus} the stroke travel of the pump piston can be preset to be continuous or stepped.

[By means of the steps that] ^{The} spacer cams, which [come into] contact [with] the upper edge of the container in the attached state, ~~are~~ ^{have} [provided] on the inside of a screw connector of the attachment for connecting it with the container [so that an] ^{An} air exchange with the atmosphere is provided in the attached state, ^{and} [it is achieved]

that] the ventilation of the container is assured when the attachment [has been] ^{is} screwed on the container.

To attach the pump piston in a simple manner, [the means are advantageous that] the pump piston has a piston rod formed on [it] ^{the pump piston,} centered or eccentric, on [whose] ^{which} backward oriented end section a releasable hinged connection with the upper section of the actuating handle is provided.

If [it is provided that] a protrusion made of a soft material is arranged on the interior, on the container side, of the lower section of the actuating handle for forming a stop between the actuating handle and the container, the hard contact of the actuating handle with the container wall is prevented. Here, the stop can also be designed for changing the pivot path for actuating the pump piston.

[Moreover, the steps add to] ^{There is} good handling [that] ^{because} the manual pump unit and the attachment are arranged [in such a way, and] ^{so} their weight is compensated [that in the] ^{In an} empty state and with the attachment placed on it and the manual pump unit attached, the container remains upright.

The interior of the breast pump can be variably ventilated by [means of the steps that] a secondary air regulating unit, which can be operated manually from the outside, [is provided] on the cap element for ventilating the suction chamber, which varies during the pump operation.

There is
 [Here,] a simple construction [along with] easy manipulation
 [consists in that] because the secondary air regulating unit [is provided
 with] a rotatable insert and/or attachment arranged on the exterior
 of the cap element, by [means of whose] which rotation a flow-through
 conduit, which leads through a wall in the cap element into the
 stroke chamber, is opened to a greater or lesser extent, or can be
 completely closed. In this case the setting preferably is
 continuous and can be reproduced, for example, [by means of] with markings
 which can be felt. A vacuum is automatically reduced when the
 flow-through conduit is open, and the degree of the vacuum [can be] is
 individually selected. It is advantageous for health care reasons,
 if it is produced from silicon.

BRIEF DESCRIPTION OF THE DRAWINGS
 [The] This invention [will be] explained in greater detail [by means] in view
 of an exemplary embodiment, [making reference to] wherein the drawings [is
 Shown are in:] show

Figs. 1A to 1E] as views of a breast pump with a container from
 the front, [from] the rear, [from] above, [or] in a perspective
 representation [] ;

Figs. 2A to 2E] as views of a manual pump unit employed with the breast
 pump in a [lateral] side view, [from the] a rear view, [from the] a front view, [from above] a top view
 and [or] in a perspective representation [] ;

Figs. 3A to 3E] as views of an actuating handle employed with the breast
 pump from [the] a front, [from the] a right side, [from the] a left side, [from
 the] a rear, [from below, or from above,] a bottom and a top ;

4F
as views of

Figs. 4A to 4E, a cap element employed with the breast pump from [the] side, [from the] rear, [from the] front, [from below, from above, or] in a perspective view;

as views of

Figs. 5A to 5E, a pump piston employed with the breast pump in a perspective [view], [from above], [from the] side, [from the] rear, [or from the] front;

as views of

Figs. 6A to 6E, a further manual pump unit, in which a different retracting mechanism and a secondary air regulating unit are provided in contrast to the previous exemplary embodiments;

as views of

Figs. 7A and 7B, a cross section through the manual pump unit in accordance with Figs. 6A, 6D and 6E in a [bottom] view [from below], or in a detailed view [x].

DESCRIPTION OF PREFERRED EMBODIMENTS

As [can be seen] in Fig. 1, the breast pump 1 has a container 2 for receiving [the] pumped out milk, an attachment 6 screwed on [it], a manual pump unit 3 releasably attached to the latter, [consisting of] an actuating handle 4 and a cap element 5, releasably connected with the [latter].

the container 2

having

cap element 5

The attachment 6 is screwed by means of a screw connector 6.2 to a collar section of the container 2, which surrounds the container opening. A breast attachment element 6.1 is connected in a [known] manner [known per se] to a cover section of the screw connector 6.2, wherein a flow-through valve is arranged approximately in the area of the cover element, through which the pumped milk reaches the container 2 and [can be] prevented from [leaving] the container 2,

is

exiting

or cannot be aspirated back.

On the attachment 6, the manual pump unit 3 with the cap element 5 ^{is} [has been] tightly placed on a connecting element in the form of a sleeve which projects upward parallel with the container axis and has an appropriately matched coupling element 5.3, which is sealed, for example, by means of a cone seal or an additional sealing element and is [represented] ^{shown} in Figs. 2C, 4C and 4D. The coupling element 5.3 is formed on the inside of the upper wall of the cap element 5, extending downward, and makes a transition into a connecting conduit 5.7, which terminates in a stroke chamber also formed in the cap element 5, as shown in Fig. 4B. A retaining element 5.1 in the form of a snap-in tongue projects from the underside of the cap element 5, which snaps into a snap-[] in shoulder at the lower edge of the screw connector 5.2, wherein the snap-in tongue is displaced against its spring force by means of a snap-in ramp at the end, when the cap element 5 is attached.

The stroke chamber 5.2 is arranged in the rear section of the cap element 5 facing away from the attachment element 6.1 and has a stroke chamber opening 5.4 on its rear, while it is closed off toward the front [by means of] ^{with} a front face 5.9. The stroke chamber 5.2 is designed to be curved in accordance with the movement path of a pump piston 7, which is moved back and forth [in it by means of] ^{therein with} the actuating handle 4. Retaining flaps, or retaining strips 5.5 of a retaining element which is U-shaped in

cross section, are provided on the underside of the cap element 5 at the side, and have in their lower area near the free end bearing eyes 5.6 for the insertion of correspondingly designed bearing pins 4.4 of the actuating handle 4 in order to make a releasable, hinged connection of the actuating handle 4 on the cap element 5.

[Moreover, strips, which extend] ^{Strips extending} essentially parallel with the container axis, [have been] ^{are} formed on both sides of the interior of the front section of the cap element 5, as well as suspension elements 5.8, in which retracting springs 8, for example rubber rings, are suspended, in order to bring, by means of a spring force, the actuating handle 4 attached to the cap element 5 after its deflection back into the initial position, in which the pump piston 7 is introduced into the stroke chamber 5.2, as [can be seen] ^{shown} in Fig. 2A. Corresponding further suspension elements 4.3 are attached to strips 4.5 on the inside of the actuating handle 4. The strips 4.5 also support the bearing pins 4.4, as [can be seen] ^{shown} in Figs. 2C, 3A, 3E and 3F.

With its upper section 4.1, which is located above the hinge axis, the actuating handle 4 makes a steadily curving transition at the top and the sides into the curves of the cap element 5 [and, in]. In the completely inserted position of the pump piston 7, it closes the stroke chamber 5.4, as shown in Figs. 1A and 2A. A lower section 4.2, oriented backward at an obtuse angle, which in cross section is also convexly curved outward, follows the upper section

4.1 of the actuating handle 4 approximately in the area of the pivot axis, so that satisfactory manipulation of the lower handle section 4.2 for performing a pumping operation results [wherein the]. The lower section 4.2 rests against the ball of the thumb, and [wherein] in the transition area between the upper section 4.1 and the lower section 4.2, the thumb and index finger, pointing forward, can grasp the upper container section. A connecting element 4.6 is formed on the inside of the upper section 4.1 for providing a connection with a piston rod 4.3 of the pump piston 7. As [can be seen] ^{shown} in Figs. 5A to 5D, the piston rod 4.3 is formed on a retainer plate 7.2, which [itself constitutes] ^{forms} a part of a piston plate 7.1 with lateral sealing edges. A soft spacer element, not [further represented] ^{shown}, can be provided on the inside in the lower section 4.2 of the actuating handle, so that during actuation the lower section 4.2 gently touches the outside of the container 2, and so that [also] ^{thus} a limitation of the stroke travel of the pump piston 7 can be set [by means of this]. Moreover, an intermediate piece, [also] not ^{shown} [represented], can be provided for limiting the stroke travel and therefore the pumping effect which, during the pivoting out of the upper section 4.1 of the actuating handle 4, can be inserted between the edge of the stroke chamber opening 5.4 and the upper section 4.1. An opening, which can be selectively released and can be closed by means of a stopper, can be provided on the back of the attachment 2 for manual ventilation when an electric pump is

attached to the ^{connecting} [connecting] sleeve.

Figs. 6A to 6E, ^{and} [and] 7A, ^{and} 7B show a further [exemplary] embodiment of the breast pump 1, wherein the manual pump unit 3 [is] provided with ^{has} a secondary air regulating unit 9 and [with] a retracting mechanism 8', which is an alternative to the previous exemplary embodiments. Otherwise the design essentially corresponds to that of the previous embodiment, wherein the reference numerals relate to corresponding parts of the breast pump 1.

The retracting mechanism ^{shown} [represented] in Figs. 6A and 6C has a spiral spring 8', which is essentially bent into a U-shape, wherein the end of [the] one [] front leg is angled off to form a suspension lug, while the other leg terminates in an outwardly bent end section. The suspension lug is fixed in a cutout formed in the lower [(in the position of use)] end section ^{in the position of use,} of the retaining element 5.1 in the shape of a support section 5.11, which ^{is} [was] formed during the manufacturing process [while the] ^{The} other leg end is inserted and supported in a support element 4.7 formed on the inside of the actuating handle 4. [With these steps, the] ^{The} spiral spring can be easily mounted and removed, for example [in the course of] ^{while} ~~during~~ disassembling the cap element 5 and the actuating handle 4. The spiral spring is preferably embodied as a steel spring and maintains its spring properties permanently and can also be cleaned [without problems] by boiling. In the installed state it projects

with the U-shaped arch upward into a hollow space formed between the cap element 5 and the actuating handle 4, so that it is housed in [an invisible] ^{a hidden} manner.

As [can be seen from] ^{shown in} Figs. 6A, 6B, 6E, 6D [and 7B], 7A, ^{and 7B,} the secondary air regulating unit 9 is arranged laterally on the exterior of the wall of the cap element 5. It has an inlet section 9.1, which is formed in the cap element 5 and slightly projects outward, in which a central receiving pin for an insert 9.2, which can be attached from the outside, as well as a flow-[] through conduit 9.11, which terminates in the stroke chamber 5.2 in the vicinity of the front wall 5.9, are provided, as [can be seen] ^{shown} in Figs. 7A and 7B. An opening 9.21 is formed in the insert 9.2, which [has been] ^{is} aligned or can be aligned with the flow-[] through conduit 9.11. The inlet section 9.1 and the insert 9.2 are covered by a removable cover 9.3, preferably made of silicon, wherein a slot 9.31 can be more or less aligned with the opening 9.21. The opening 9.21 terminates in a laterally widened section, so that the amount of the covering of the conduit leading outward from the stroke chamber 5.2 can be easily varied within a wide range by an appropriate rotation of the cover 9.3. For simple actuation, the cover 9.3 has grip elements, which project rib-like from the circumference, one of which is thickened for marking a position of rotation. As [can be seen] ^{shown} in Fig. 7B [in particular], a lip-like edge of the cover 9.3 extends below an outward projecting

circumferential collar of the inlet section 9.1, so that satisfactory retention and [satisfactory] sealing of the cover 9.3 result.

The secondary air regulation unit 9 provides a continuous, reproducible regulating possibility for air conducted into the suction chamber of the breast pump. A built-up vacuum is automatically reduced by means of the secondary air opening being opened to a greater or lesser extent, and the size of the vacuum can be individually selected. Automatically intermittent pumping can be performed.

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Milk Sucking Pump

The invention relates to a breast pump with an attachment, which is or can be releasably applied to the opening of a container and has a breast attachment element, and with a manual pump unit, which is releasably connected to the attachment by means of a connecting sleeve or a connecting bore, which has a cap-shaped connecting section, as well as a pump piston, which can be moved back and forth in a stroke chamber by means of an actuating handle, which is pivotable and provided with a retracting mechanism.

Such a breast pump with a manual pump unit is disclosed in DE 87 14 995 U1. With this known breast pump, an attachment with a funnel-shaped breast attachment element and with a pump connector is releasably screwed to a container. A cap-shaped section of the manual pump unit is placed on the pump connecting element. A pump cylinder with a pump piston guided in its interior is attached, horizontally projecting to the rear, to the cap-like section. The pump piston is moved back and forth with the aid of a lever-shaped actuating handle wherein, for returning the pump piston, the handle is supported by means of a U-shaped spring on a support fastened underneath the pump cylinder which extends as far as the underside of the container. The construction of the manual pump unit is relatively bulky and cumbersome, so that disadvantages can also result in the course of manipulating it.

In connection with another breast pump represented in EP 0 330 845 A2, a manual pump unit has a manual actuating element, which axially extends out of the pump cylinder toward the rear and is moved by one hand in the axial direction, while the breast pump is held with other hand. Thus, both hands are required for manipulation.

A pump cylinder of a breast pump shown in EP 0 385 933 A2 is oriented obliquely upward. A pump piston, which is guided in its interior, is actuated by means of two actuating elements, which are conducted laterally along the pump cylinder, and by a transverse strip, which is hingedly fastened on the actuating elements above the pump cylinder and moves upward when the actuating element is pressed together at the center, and downward, when it is released, in order to move the pump piston back and forth. The actuating unit with the pump piston can be replaced by an electrical pump, which is connected by means of a cover, which can be placed on the top of the pump cylinder.

The object of the invention is based on making available a breast pump of the type mentioned at the outset, which provides improved manipulation along with a simplified construction.

This object is attained by means of the characteristics of claim 1. In accordance therewith it is provided that the cap-shaped connecting section and the stroke chamber are combined in a mutual cap element, which is fixed on the attachment by retaining

means, and that the retracting mechanism, one side of which acts on the actuating handle, is seated with the other side on the cap element.

Simple cleaning and manipulation are assisted in that, in the completely inserted state of the pump piston, a stroke chamber opening on the side of the stroke chamber facing away from the breast connection element is covered by an upper section of the actuating handle which, in the position of use, is located above a pivot axis.

An easy movement of the piston and the connected actuation elements, which is free of wear to a considerable extent over time, is achieved in that the stroke chamber in the cap element is curved in an arc-shape in accordance with a movement path of the pump piston, which is actuated by the upper section of the actuating handle.

The entry of air into the piston chamber and the pumping effect are aided in that, with the container attached, a pivot path of the upper section of the actuating handle in the area of its connection to the pump piston has been selected to be so large that, in the moved-out state, at least an upper edge section of the pump piston is outside of an upper opening edge of the stroke chamber opening. In a similar manner it would be possible to cut, for example, a groove, or a bore, or the like, into the piston wall.

A simple, well functioning retracting mechanism is created and cleaning is made easier by means of the steps, wherein the retracting mechanism has at least one tension spring, and that a suspension element is positioned on the actuating handle, and a further suspension element on the cap element, in such a way, that with the piston in the inserted position, the direction of the tensile force lies above the pivot axis of the actuating handle, at least until, with the container attached, the actuating handle reaches its maximum pivot angle in the retraction direction of the pump piston, and that with the container removed and with a further increased pivot angle the direction of the tensile force lies below the pivot axis, so that the actuating handle is kept in the opened position in relation to the cap element.

An alternative embodiment of a well functioning, simple retracting mechanism consists in that the retracting mechanism has at least one pressure spring, that a support element on the inside of the actuating handle and a support section at the cap element are positioned in such a way that, at least with the piston rod inserted, the direction of the force of pressure lies below the pivot axis of the actuating handle. A rubber block, a spiral spring or a spiral spring, for example, can be employed here.

A restoring force which remains stable over time is achieved here with simple means in that the pressure spring is embodied as a spiral spring, whose front suspension lug is suspended and

retained in a support section of a free end section of the retaining element, which is oriented downward when in use, arcs upward in a U-shape in an interior chamber of the cap element and the grip and is supported with a free end section bent off from the suspension lug on a support element arranged on the inside of the actuating handle. In this case the support section and the support element can be formed on the retaining element, or the actuating handle. The spiral spring, which for example is made of steel, is thermally stable and can be cleaned by being boiled. It can be simply mounted and can be easily housed so it is invisible.

The manual pump unit can be easily replaced by an electric pump in that an electric pump can be directly connected by means of a hose to the connecting sleeve arranged on the attachment or to the connecting bore.

Simple sealing, which aids a good pumping effect, is achieved in that the connecting point between the connecting sleeve or the connecting bore and the cap element is sealed by means of conical connection or of a seal ring.

During electrical operation, if the electric pump does not have automatic ventilation, ventilation can be manually regulated by means of the steps that an opening is provided on the attachment in the area of the connecting sleeve or the connection bore, which can be closed by means of a stopper or, when the stopper has been removed, by hand.

A simple, releasable coupling between the attachment and the manual pump unit is achieved in that the retaining means have a snap-in element which snaps together with the attachment, when the cap element has been coupled to the attachment. Design and operation are in this case made easier by the steps in that the snap-in element is embodied as a snap-in tongue, which is oriented toward the container with a free end section and which, in the attached state, extends with a snap-in section behind an edge of the attachment facing toward the container when the cap element, located opposite the snap-in tongue, has been pushed on the connecting sleeve or the connecting bore, which are oriented axis-parallel in relation to the container.

Operation is furthermore made easier in that on its interior the cap element has retaining flaps or ribs on both sides, which constitute guide elements when it is placed on the attachment and securing elements against twisting of the cap element in relation to the attachment.

The fact that seating elements are arranged on both lateral sections of the cap element on the one hand and, on the other hand on both lateral sections of the actuating handle which, in the form of separable bearing pin/bearing eye connection, constitute the pivot axis between the actuating handle and the cap element, adds to the simple construction and simple operation.

A shape of the manual pump unit which is advantageous in respect to cleaning and handling, consists in that in the rear area remote from the breast attachment element the cap element has a rounded top which, in the pivoted-in state of the upper section of the actuating handle, makes a steady transition into the also curved exterior of the latter.

The operation of the manual pump is made easier in that in cross section the upper section and the lower section are outwardly rounded on their rear facing away from the breast attachment element and make a steady transition into each other, wherein an obtuse angle, open toward the rear, is formed between the upper section and the lower section.

A simple change of the pump output is achieved in that an intermediate piece is provided, which can be inserted into a V-shaped gap which, when the actuating handle is pivoted, is formed in the upper area between the upper section of the latter and the edge of the stroke chamber opening, and by means of which the stroke travel of the pump piston can be preset to be continuous or stepped.

By means of the steps that spacer cams, which come into contact with the upper edge of the container in the attached state, are provided on the inside of a screw connector of the attachment for connecting it with the container, so that an air exchange with the atmosphere is provided in the attached state, it is achieved

that the ventilation of the container is assured when the attachment has been screwed on the container.

To attach the pump piston in a simple manner, the means are advantageous that the pump piston has a piston rod formed on it centered or eccentric, on whose backward oriented end section a releasable hinged connection with the upper section of the actuating handle is provided.

If it is provided that a protrusion made of a soft material is arranged on the interior, on the container side, of the lower section of the actuating handle for forming a stop between the actuating handle and the container, the hard contact of the actuating handle with the container wall is prevented. Here, the stop can also be designed for changing the pivot path for actuating the pump piston.

Moreover, the steps add to good handling, that the manual pump unit and the attachment are arranged in such a way, and their weight is compensated, that in the empty state and with the attachment placed on it and the manual pump unit attached, the container remains upright.

The interior of the breast pump can be variably ventilated by means of the steps that a secondary air regulating unit, which can be operated manually from the outside, is provided on the cap element for ventilating the suction chamber, which varies during the pump operation.

Here, a simple construction along with easy manipulation consists in that the secondary air regulating unit is provided with a rotatable insert and/or attachment arranged on the exterior of the cap element, by means of whose rotation a flow-through conduit, which leads through a wall in the cap element into the stroke chamber, is opened to a greater or lesser extent, or can be completely closed. In this case the setting preferably is continuous and can be reproduced, for example, by means of markings which can be felt. A vacuum is automatically reduced when the flow-through conduit is open, and the degree of the vacuum can be individually selected. It is advantageous for health care reasons, if it is produced from silicon.

The invention will be explained in greater detail by means of an exemplary embodiment, making reference to the drawings. Shown are in:

Figs. 1A to 1E, views of a breast pump with a container from the front, from the rear, from above, or in a perspective representation,

Figs. 2A to 2E, a manual pump unit employed with the breast pump in a lateral view, from the rear, from the front, from above, or in a perspective representation,

Figs. 3A to 3F, an actuating handle employed with the breast pump from the front, from the right side, from the left side, from the rear, from below, or from above,

Figs. 4A to 4E, a cap element employed with the breast pump from the side, from the rear, from the front, from below, from above, or in a perspective view,

Figs. 5A to 5E, a pump piston employed with the breast pump in a perspective view, from above, from the side, from the rear, or from the front,

Figs. 6A to 6E, a further manual pump unit, in which a different retracting mechanism and a secondary air regulating unit are provided in contrast to the previous exemplary embodiments, and

Figs. 7A and 7B, a cross section through the manual pump unit in accordance with Figs. 6A, 6D and 6E in a view from below, or in a detailed view x.

As can be seen in Fig. 1, the breast pump 1 has a container 2 for receiving the pumped out milk, an attachment 6 screwed on it, a manual pump unit 3 releasably attached to the latter, consisting of an actuating handle 4 and a cap element 5, releasably connected with the latter.

The attachment 6 is screwed by means of a screw connector 6.2 to a collar section of the container 2, which surrounds the container opening. A breast attachment element 6.1 is connected in a manner known per se to a cover section of the screw connector 6.2, wherein a flow-through valve is arranged approximately in the area of the cover element, through which the pumped milk reaches the container 2 and can be prevented from leaving the container 2,

or cannot be aspirated back.

On the attachment 6, the manual pump unit 3 with the cap element 5 has been tightly placed on a connecting element in the form of a sleeve which projects upward parallel with the container axis and has an appropriately matched coupling element 5.3, which is sealed, for example, by means of a cone seal or an additional sealing element and is represented in Figs. 2C, 4C and 4D. The coupling element 5.3 is formed on the inside of the upper wall of the cap element 5, extending downward, and makes a transition into a connecting conduit 5.7, which terminates in a stroke chamber also formed in the cap element 5, as shown in Fig. 4B. A retaining element 5.1 in the form of a snap-in tongue projects from the underside of the cap element 5, which snaps into a snap-in shoulder at the lower edge of the screw connector 5.2, wherein the snap-in tongue is displaced against its spring force by means of a snap-in ramp at the end, when the cap element 5 is attached.

The stroke chamber 5.2 is arranged in the rear section of the cap element 5 facing away from the attachment element 6.1 and has a stroke chamber opening 5.4 on its rear, while it is closed off toward the front by means of a front face 5.9. The stroke chamber 5.2 is designed to be curved in accordance with the movement path of a pump piston 7, which is moved back and forth in it by means of the actuating handle 4. Retaining flaps, or retaining strips 5.5 of a retaining element which is U-shaped in

cross section, are provided on the underside of the cap element 5 at the side, and have in their lower area near the free end bearing eyes 5.6 for the insertion of correspondingly designed bearing pins 4.4 of the actuating handle 4 in order to make a releasable, hinged connection of the actuating handle 4 on the cap element 5. Moreover, strips, which extend essentially parallel with the container axis, have been formed on both sides of the interior of the front section of the cap element 5, as well as suspension elements 5.8, in which retracting springs 8, for example rubber rings, are suspended, in order to bring, by means of a spring force, the actuating handle 4 attached to the cap element 5 after its deflection back into the initial position, in which the pump piston 7 is introduced into the stroke chamber 5.2, as can be seen in Fig. 2A. Corresponding further suspension elements 4.3 are attached to strips 4.5 on the inside of the actuating handle 4. The strips 4.5 also support the bearing pins 4.4, as can be seen in Figs. 2C, 3A, 3E and 3F.

With its upper section 4.1, which is located above the hinge axis, the actuating handle 4 makes a steadily curving transition at the top and the sides into the curves of the cap element 5 and, in the completely inserted position of the pump piston 7, it closes the stroke chamber 5.4, as shown in Figs. 1A and 2A. A lower section 4.2, oriented backward at an obtuse angle, which in cross section is also convexly curved outward, follows the upper section

4.1 of the actuating handle 4 approximately in the area of the pivot axis, so that satisfactory manipulation of the lower handle section 4.2 for performing a pumping operation results, wherein the lower section 4.2 rests against the ball of the thumb, and wherein in the transition area between the upper section 4.1 and the lower section 4.2, the thumb and index finger, pointing forward, can grasp the upper container section. A connecting element 4.6 is formed on the inside of the upper section 4.1 for providing a connection with a piston rod 4.3 of the pump piston 7. As can be seen in Figs. 5A to 5D, the piston rod 4.3 is formed on a retainer plate 7.2, which itself constitutes a part of a piston plate 7.1 with lateral sealing edges. A soft spacer element, not further represented, can be provided on the inside in the lower section 4.2 of the actuating handle, so that during actuation the lower section 4.2 gently touches the outside of the container 2, and so that also a limitation of the stroke travel of the pump piston 7 can be set by means of this. Moreover, an intermediate piece, also not represented, can be provided for limiting the stroke travel and therefore the pumping effect which, during the pivoting out of the upper section 4.1 of the actuating handle 4, can be inserted between the edge of the stroke chamber opening 5.4 and the upper section 4.1. An opening, which can be selectively released and can be closed by means of a stopper, can be provided on the back of the attachment 2 for manual ventilation when an electric pump is

attached to the connecting sleeve.

Figs. 6A to 6E and 7A, 7B show a further exemplary embodiment of the breast pump 1, wherein the manual pump unit 3 is provided with a secondary air regulating unit 9 and with a retracting mechanism 8', which is an alternative to the previous exemplary embodiments. Otherwise the design essentially corresponds to that of the previous embodiment, wherein the reference numerals relate to corresponding parts of the breast pump 1.

The retracting mechanism represented in Figs. 6A and 6C has a spiral spring 8', which is essentially bent into a U-shape, wherein the end of the one, front leg is angled off to form a suspension lug, while the other leg terminates in an outwardly bent end section. The suspension lug is fixed in a cutout formed in the lower (in the position of use) end section of the retaining element 5.1 in the shape of a support section 5.11, which was formed during the manufacturing process, while the other leg end is inserted and supported in a support element 4.7 formed on the inside of the actuating handle 4. With these steps, the spiral spring can be easily mounted and removed, for example in the course of disassembling the cap element 5 and the actuating handle 4. The spiral spring is preferably embodied as a steel spring and maintains its spring properties permanently and can also be cleaned without problems by boiling. In the installed state it projects

with the U-shaped arch upward into a hollow space formed between the cap element 5 and the actuating handle 4, so that it is housed in an invisible manner.

As can be seen from Figs. 6A, 6B, 6E, 6D and 7B, 7A, the secondary air regulating unit 9 is arranged laterally on the exterior of the wall of the cap element 5. It has an inlet section 9.1, which is formed in the cap element 5 and slightly projects outward, in which a central receiving pin for an insert 9.2, which can be attached from the outside, as well as a flow- through conduit 9.11, which terminates in the stroke chamber 5.2 in the vicinity of the front wall 5.9, are provided, as can be seen in Figs. 7A and 7B. An opening 9.21 is formed in the insert 9.2, which has been aligned or can be aligned with the flow- through conduit 9.11. The inlet section 9.1 and the insert 9.2 are covered by a removable cover 9.3, preferably made of silicon, wherein a slot 9.31 can be more or less aligned with the opening 9.21. The opening 9.21 terminates in a laterally widened section, so that the amount of the covering of the conduit leading outward from the stroke chamber 5.2 can be easily varied within a wide range by an appropriate rotation of the cover 9.3. For simple actuation, the cover 9.3 has grip elements, which project rib-like from the circumference, one of which is thickened for marking a position of rotation. As can be seen in Fig. 7B in particular, a lip-like edge of the cover 9.3 extends below an outward projecting

circumferential collar of the inlet section 9.1, so that satisfactory retention and satisfactory sealing of the cover 9.3 result.

The secondary air regulation unit 9 provides a continuous, reproducible regulating possibility for air conducted into the suction chamber of the breast pump. A built-up vacuum is automatically reduced by means of the secondary air opening being opened to a greater or lesser extent, and the size of the vacuum can be individually selected. Automatically intermittent pumping can be performed.

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C l a i m s

1. A breast pump with an attachment (6), which is or can be releasably applied to the opening of a container (2) and has a breast attachment element (6.1), and with a manual pump unit (3), which is releasably connected to the attachment by means of a connecting sleeve (5.3) or a connecting bore, which has a cap-shaped connecting section, as well as a pump piston (7), which can be moved back and forth in a stroke chamber (5.2) by means of an actuating handle (4), which is pivotable and provided with a retracting mechanism (8, 8'),

characterized in that

the cap-shaped connecting section and the stroke chamber (5.2) are combined in a mutual cap element (5), which is fixed on the attachment (5) by retaining means (5.1, 5.3), and

the retracting mechanism (8), one side of which acts on the actuating handle (4), is seated with the other side on the cap element (5).

2. The breast pump in accordance with claim 1,

characterized in that,

in the completely inserted state of the pump piston (7), a stroke chamber opening (5.4) on the side of the stroke chamber (5.2) facing away from the breast connection element (6.1) is

covered by an upper section (4.1) of the actuating handle (4) which, in the position of use, is located above a pivot axis.

3. The breast pump in accordance with claim 1 or 2, characterized in that

the stroke chamber (5.2) in the cap element (5) is curved in an arc-shape in accordance with a movement path of the pump piston (7), which is actuated by the upper section (4.1) of the actuating handle (4).

4. The breast pump in accordance with one of the preceding claims,

characterized in that,

with the container attached, a pivot path of the upper section (4.1) of the actuating handle (4) in the area of its connection to the pump piston (7) has been selected to be so large that, in the moved-out state, at least an upper edge section of the pump piston is outside of an upper opening edge of the stroke chamber opening (5.4).

5. The breast pump in accordance with one of the preceding claims,

characterized in that

the retracting mechanism (8) has at least one tension spring,

a suspension element (4.3) is positioned on the actuating handle (4), and a further suspension element on the cap element (5), in such a way, that with the inserted piston position, the direction of the tensile force lies above the pivot axis of the actuating handle (4), at least until, with the container (2) attached, the actuating handle (4) reaches its maximum pivot angle in the retraction direction of the pump piston (7), and

with the container (2) removed and with a further increased pivot angle the direction of the tensile force lies below the pivot axis, so that the actuating handle (4) is kept in the opened position in relation to the cap element (5).

6. The breast pump in accordance with one of claims 1 to 4, characterized in that

the retracting mechanism (8') has at least one pressure spring,

a support element (4.7) on the inside of the actuating handle (4) and a support section (5.11) at the cap element (5) are positioned in such a way that, at least with the piston rod inserted, the direction of the force of pressure lies below the pivot axis of the actuating handle (4).

7. The breast pump in accordance with claim 6,
characterized in that

the pressure spring is embodied as a spiral spring, whose front suspension lug is suspended and retained in a support section (5.11) of a free end section of the retaining element (5.1), which is oriented downward when in use, arcs upward in a U- shape in an interior chamber of the cap element (5) and the grip (6) and is supported with a free end section bent off from the suspension lug on a support element (4.7) arranged on the inside of the actuating handle (4).

8. The breast pump in accordance with one of the preceding claims,

characterized in that

an electric pump can be directly connected by means of a hose to the connecting sleeve arranged on the attachment (6) or to the connecting bore.

9. The breast pump in accordance with one of the preceding claims,

characterized in that

the connecting point between the connecting sleeve (5.3) or the connecting bore and the cap element (5) is sealed by means of conical connection or of a seal ring.

10. The breast pump in accordance with one of the preceding claims,

characterized in that

an opening is provided on the attachment (6) in the area of the connecting sleeve (5.3) or the connection bore, which can be closed by means of a stopper or, when the stopper has been removed, by hand.

11. The breast pump in accordance with one of the preceding claims,

characterized in that

the retaining means have a snap-in element (5.1) which snaps together with the attachment (6), when the cap element (5) has been coupled to the attachment (6).

12. The breast pump in accordance with claim 11,

characterized in that

the snap-in element is embodied as a snap-in tongue (5.1), which is oriented toward the container (2) with a free end section which, in the attached state, extends with a snap-in section behind an edge of the attachment (6) facing toward the container (2) when the cap element (5), located opposite the snap-in tongue (5.1), has been pushed on the connecting sleeve (5.3) or the connecting bore, which are oriented axis-parallel in relation to the container (2).

13. The breast pump in accordance with one of the preceding claims,

characterized in that

on its interior the cap element (5) has retaining flaps (5.5) or ribs on both sides, which constitute guide elements when it is placed on the attachment (6) and securing elements against twisting of the cap element (5) in relation to the attachment (6).

14. The breast pump in accordance with one of the preceding claims,

characterized in that

seating elements are arranged on both lateral sections of the cap element (5) on the one hand and, on the other hand on both lateral sections of the actuating handle (4) which, in the form of separable bearing pin/bearing eye connection, constitute the pivot axis between the actuating handle (4) and the cap element (5).

15. The breast pump in accordance with one of claims 2 to 14,

characterized in that

in the rear area remote from the breast attachment element (6.1) the cap element (5) has a rounded top which, in the pivoted-in state of the upper section (4.1) of the actuating handle (4), makes a steady transition into the also curved exterior of the

latter.

16. The breast pump in accordance with one of the preceding claims,

characterized in that

in cross section the upper section (4.1) and the lower section (4.2) are outwardly rounded on their rear facing away from the breast attachment element (6.1) and make a steady transition into each other, wherein an obtuse angle, open toward the rear, is formed between the upper section (4.1) and the lower section (4.2).

17. The breast pump in accordance with one of the preceding claims,

characterized in that

an intermediate piece is provided, which can be inserted into a V-shaped gap which, when the actuating handle (4) is pivoted, is formed in the upper area between its upper section (4.1) and the edge of the stroke chamber opening (5.4), by means of which the stroke travel of the pump piston (7) can be preset to be continuous or stepped.

18. The breast pump in accordance with one of the preceding claims,

characterized in that

spacer cams, which come into contact with the upper edge of the container (2) in the attached state, are provided on the inside of a screw connector (6.2) of the attachment (6) for connecting it with the container (6), so that an air exchange with the atmosphere is provided in the attached state.

19. The breast pump in accordance with one of the preceding claims,

characterized in that

the pump piston (7) has a piston rod (7.3) formed on it centered or eccentric, on whose backward oriented end section a releasable hinged connection with the upper section (4.1) of the actuating handle (4) is provided.

20. The breast pump in accordance with one of the preceding claims,

characterized in that

a protrusion made of a soft material is arranged on the interior, on the container side, of the lower section (4.2) of the actuating handle (4) for forming a stop between the actuating handle (4) and the container (2).

21. The breast pump in accordance with one of the preceding claims,

characterized in that

the manual pump unit (3) and the attachment (6) are arranged in such a way, and their weight is compensated, that in the empty state and with the attachment (6) placed on it and the manual pump unit attached (3), the container (2) remains upright.

22. The breast pump in accordance with one of the preceding claims,

characterized in that

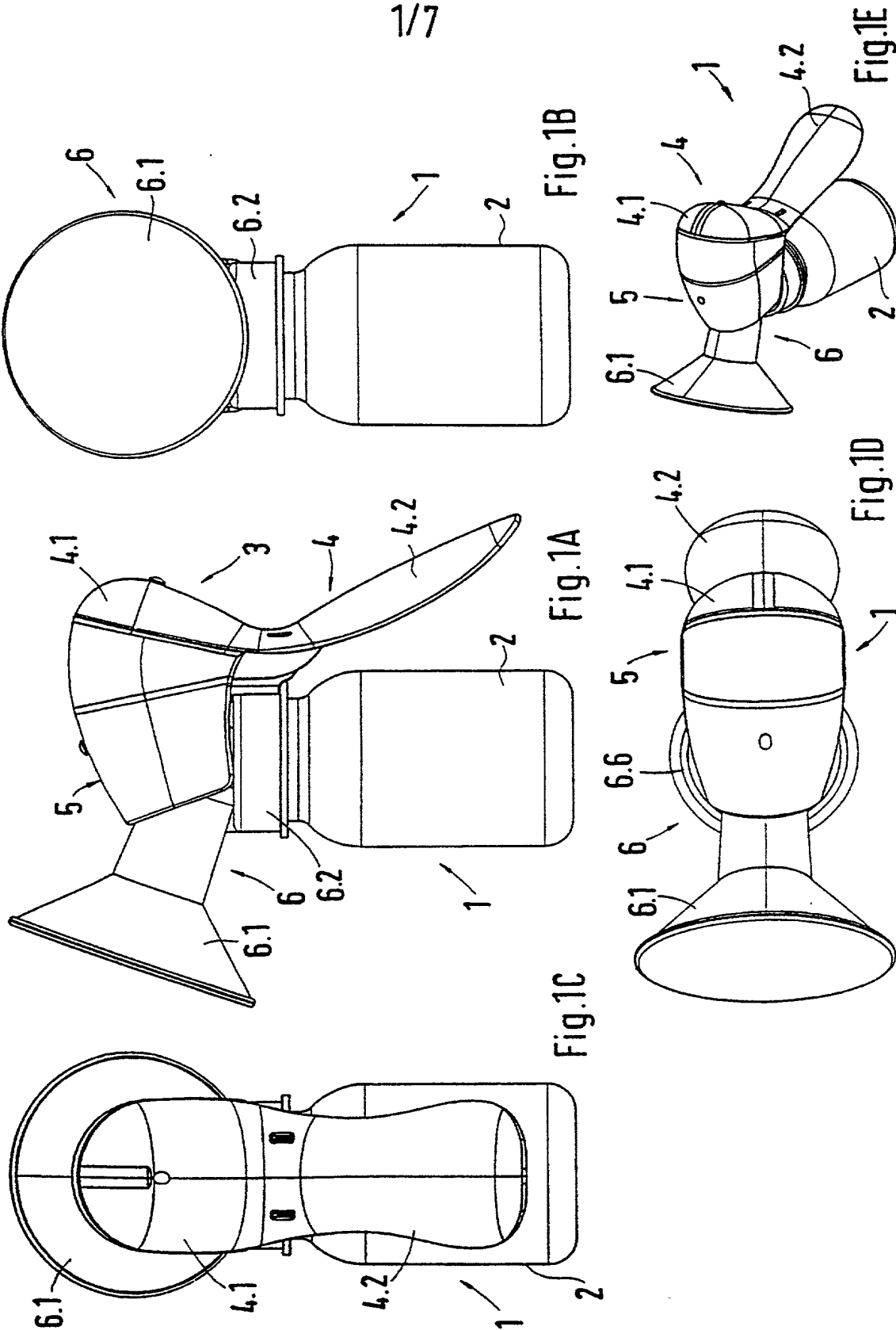
a secondary air regulating unit (9), which can be operated manually from the outside, is provided on the cap element (5) for ventilating the suction chamber, which varies during the pump operation.

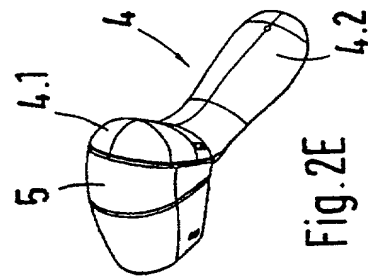
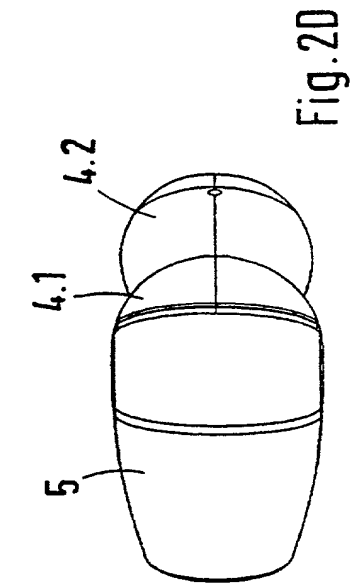
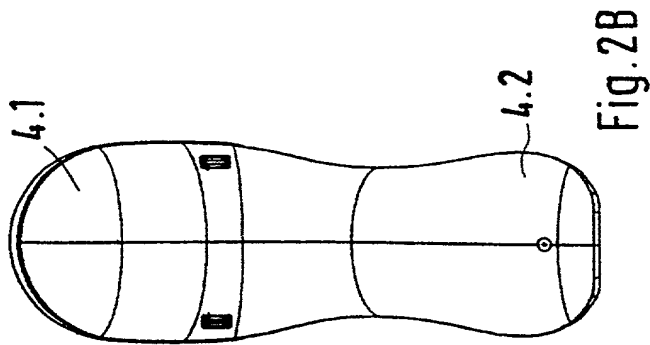
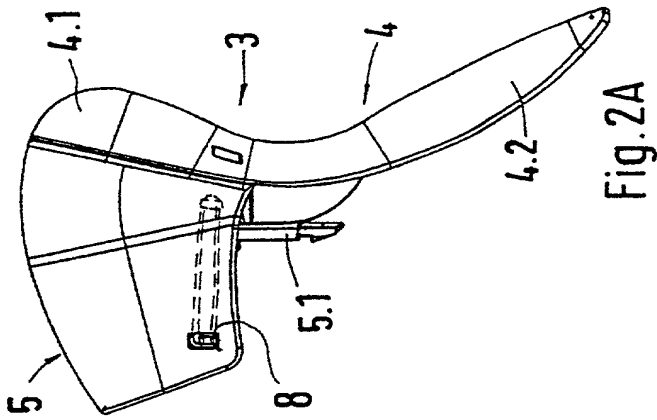
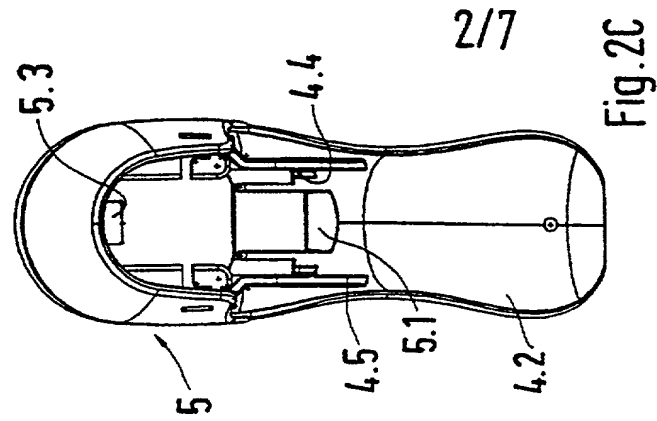
23. The breast pump in accordance with claim 22,

characterized in that

the secondary air regulating unit (9) is provided with a rotatable insert (9.2) and/or attachment (9.3) arranged on the exterior of the cap element (5), by means of whose rotation a flow-through conduit, which leads through a wall in the cap element (5) into the stroke chamber (5.2), is opened to a greater or lesser extent, or can be completely closed.

1/7





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3/7

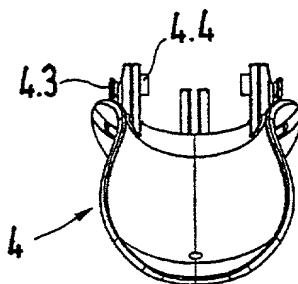


Fig. 3E

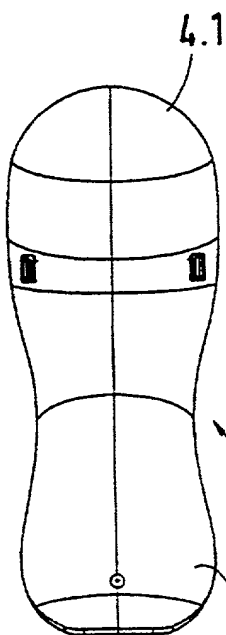


Fig. 3D

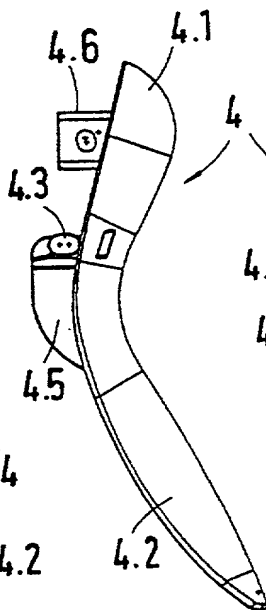


Fig. 3B

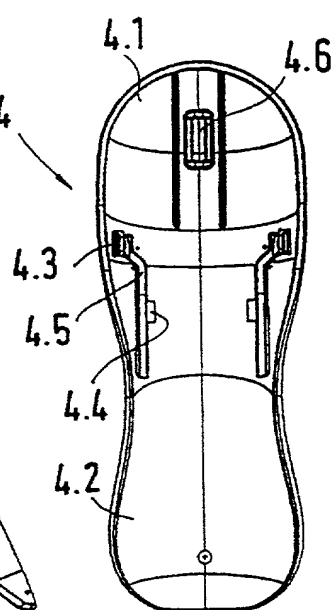


Fig. 3A

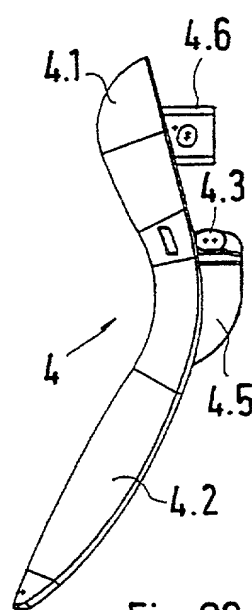


Fig. 3C

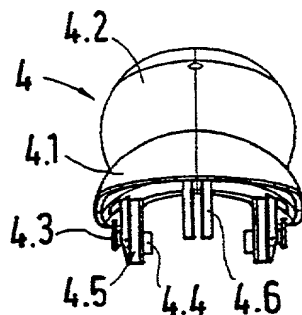
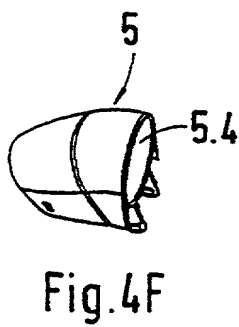
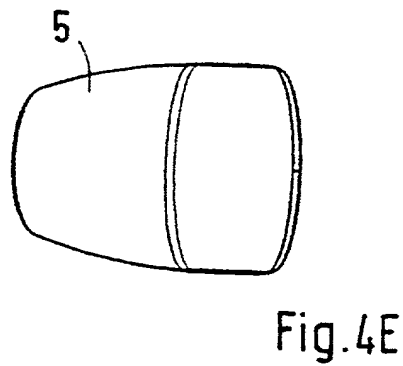
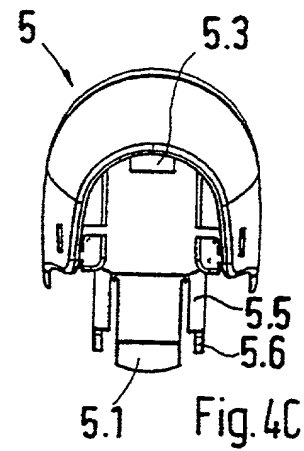
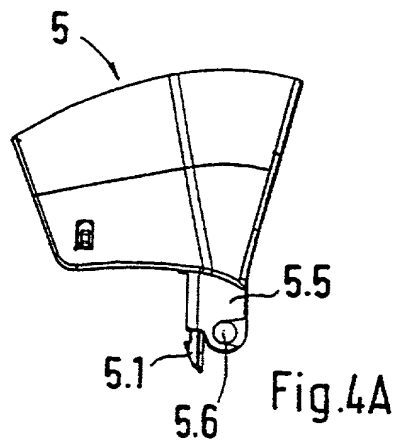
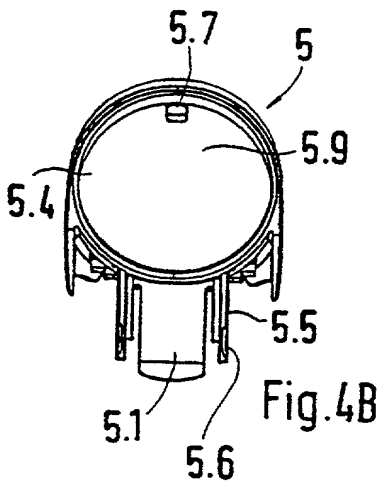
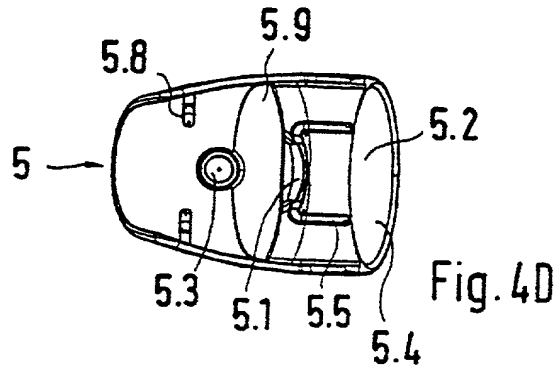


Fig. 3F

4/7



5/7

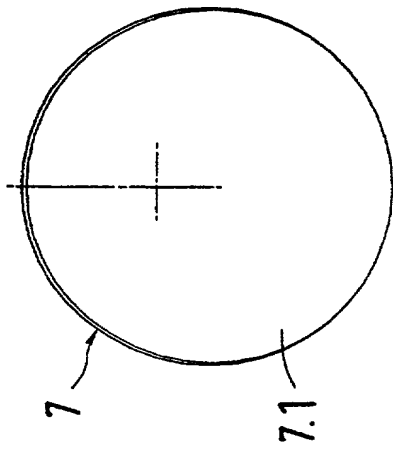


Fig. 5E

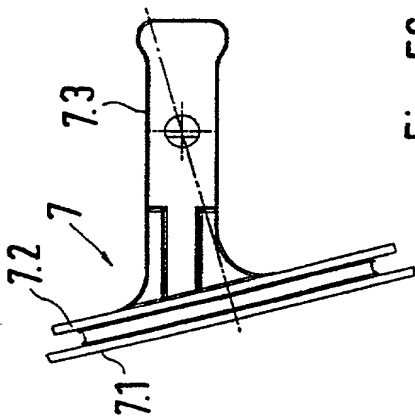


Fig. 5C

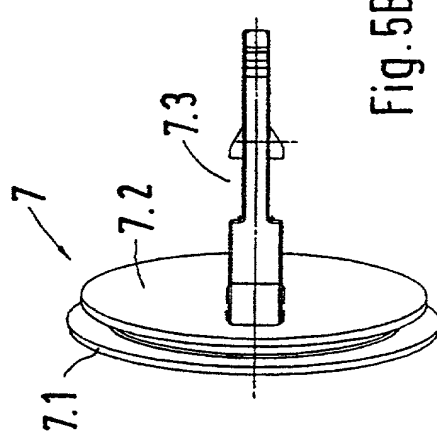


Fig. 5B

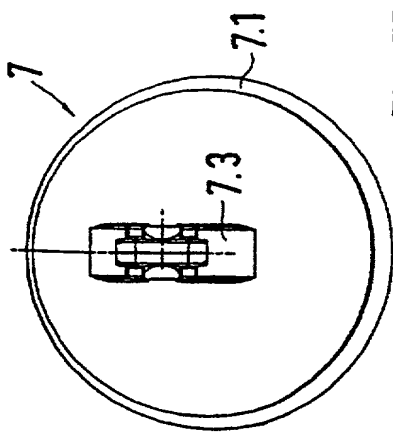


Fig. 5D

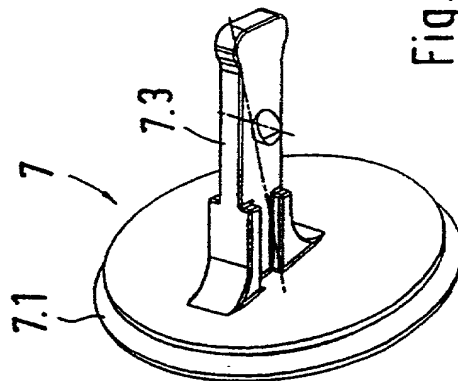


Fig. 5A

6/7

79

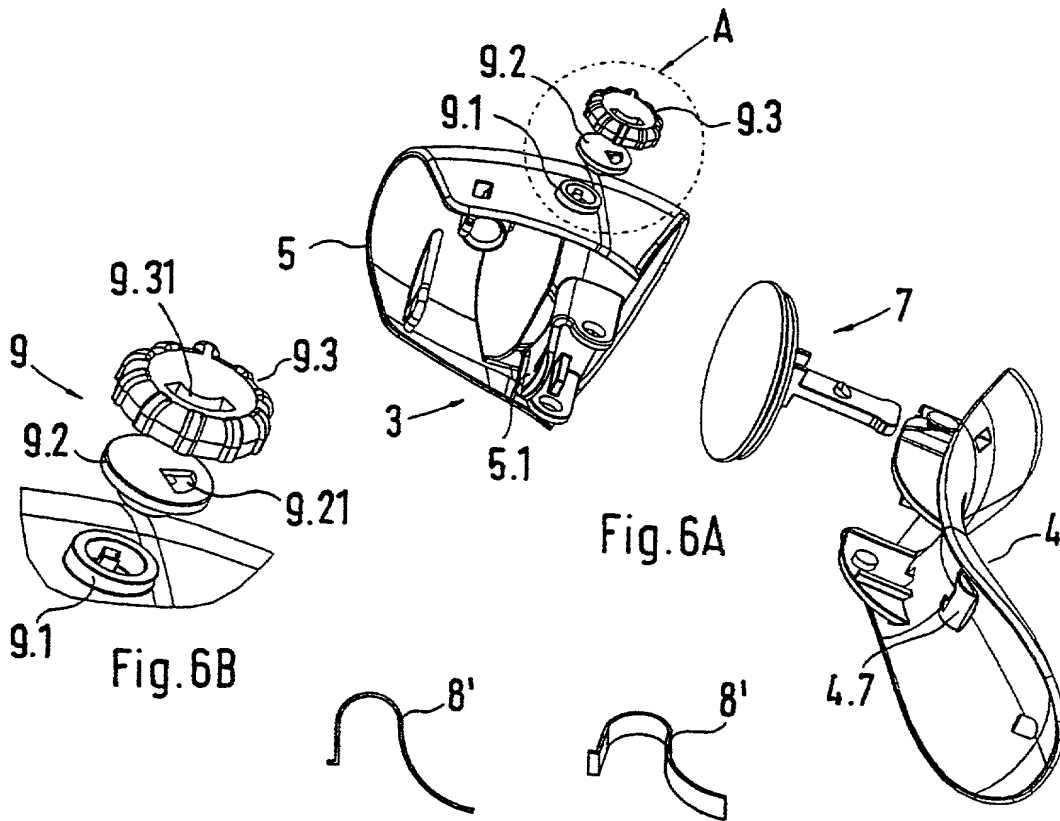


Fig. 6A

Fig. 6B

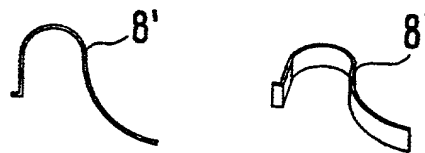


Fig. 6C

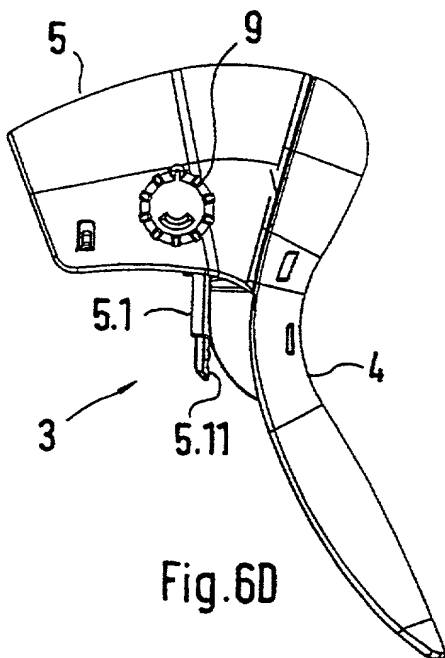


Fig. 6D

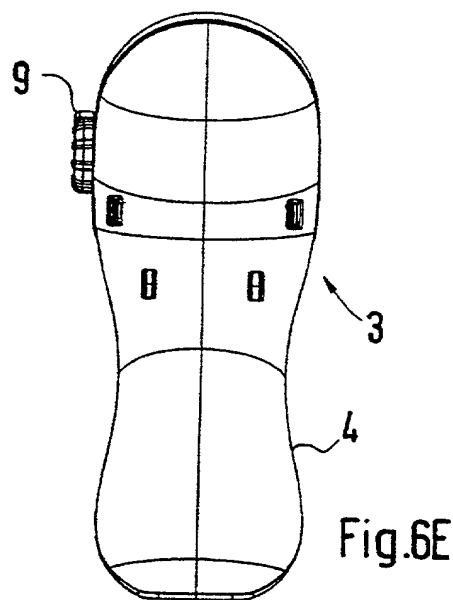


Fig. 6E

7/7

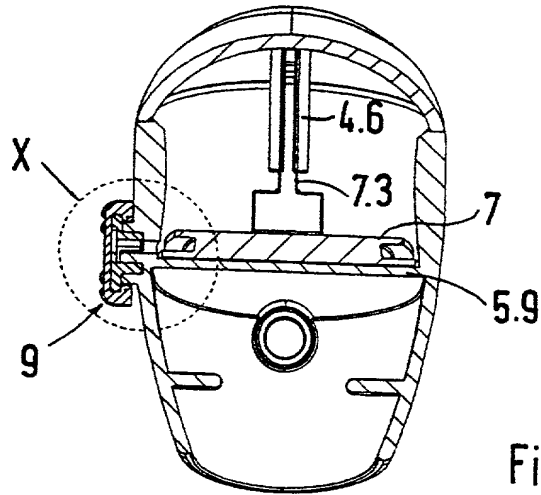


Fig. 7A

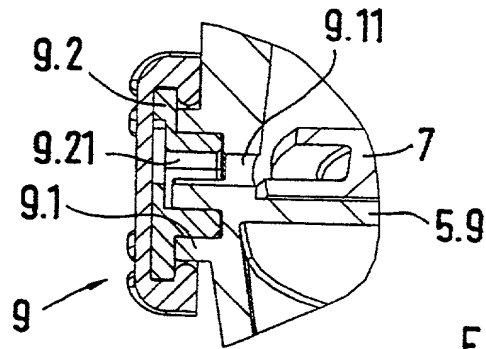


Fig. 7B

Declaration and Power of Attorney For Patent Application

Erklärung Für Patentanmeldungen Mit Vollmacht

German Language Declaration

Als nachstehend benannter Erfinder erkläre ich hiermit an Eides Statt:

dass mein Wohnsitz, meine Postanschrift, und meine Staatsangehörigkeit den im Nachstehenden nach meinem Namen aufgeführten Angaben entsprechen,

dass ich, nach bestem Wissen der ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder (falls nachstehend mehrere Namen aufgeführt sind) des Gegenstandes bin, für den dieser Antrag gestellt wird und für den ein Patent beantragt wird für die Erfindung mit dem Titel:

MILCHABSAUGPUMPE

deren Beschreibung

(zutreffendes ankreuzen)
☒ hier beigefügt ist.

☐ am _____ unter der
Anmeldungsseriennummer _____

eingereicht wurde und am _____
abgeändert wurde (falls tatsächlich
abgeändert).

Ich bestätige hiermit, dass ich den Inhalt der obigen Patentanmeldung einschliesslich der Ansprüche durchgesehen und verstanden habe, die eventuell durch einen Zusatzantrag wie oben erwähnt abgeändert wurde.

Ich erkenne meine Pflicht zur Offenbarung irgendwelcher Informationen, die für die Prüfung der vorliegenden Anmeldung in Einklang mit Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) von Wichtigkeit sind, an.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäss Abschnitt 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 119 aller unten angegebenen Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde, und habe auch alle Auslandsanmeldungen für ein Patent oder eine Erfindersurkunde nachstehend gekennzeichnet, die ein Anmeldedatum haben, das vor dem Anmeldedatum der Anmeldung liegt, für die Priorität beansprucht wird.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

MILK SUCKING PUMP

the specification of which

(check one)
☒ is attached hereto.

☐ was filed on _____ as
Application Serial No. _____

and was amended on _____
(if applicable)

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

German Language Declaration

Prior foreign applications
Priorität beansprucht

Priority Claimed

<u>199 54 112.4</u> (Number) (Nummer)	<u>Germany</u> (Country) (Land)	<u>11 November 1999</u> (Day/Month/Year Filed) (Tag/Monat/Jahr eingereicht)	<input checked="" type="checkbox"/> Yes Ja	<input type="checkbox"/> No Nein
<u>PCT/EP00/04758</u> (Number) (Nummer)	<u>PCT</u> (Country) (Land)	<u>25 May 2000</u> (Day/Month/Year Filed) (Tag/Monat/Jahr eingereicht)	<input checked="" type="checkbox"/> Yes Ja	<input type="checkbox"/> No Nein
<u> </u> (Number) (Nummer)	<u> </u> (Country) (Land)	<u> </u> (Day/Month/Year Filed) (Tag/Monat/Jahr eingereicht)	<input type="checkbox"/> Yes Ja	<input type="checkbox"/> No Nein

Ich beanspruche hiermit gemäss Absatz 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 120, den Vorzug aller unten aufgeführten Anmeldungen und falls der Gegenstand aus jedem Anspruch dieser Anmeldung nicht in einer früheren amerikanischen Patentanmeldung laut dem ersten Paragraphen des Absatzes 35 der Zivilprozessordnung der Vereinigten Staaten, Paragraph 112 offenbart ist, erkenne ich gemäss Absatz 37, Bundesgesetzbuch, Paragraph 1.56(a) meine Pflicht zur Offenbarung von Informationen an, die zwischen dem Anmeldedatum der früheren Anmeldung und dem nationalen oder PCT Internationale Anmeldedatum dieser Anmeldung bekannt geworden sind.

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

<u>None</u>	<u>None</u>	<u>None</u>	<u>None</u>
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhangig aufgegeben)	(Status) (patented, pending, abandoned)
<u>None</u>	<u>None</u>	<u>None</u>	<u>None</u>
(Application Serial No.) (Anmeldeseriennummer)	(Filing Date) (Anmeldedatum)	(Status) (patentiert, anhangig aufgegeben)	(Status) (patented, pending, abandoned)

Ich erkläre hiermit, dass alle von mir in der vorliegenden Erklärung gemachten Angaben nach meinem besten Wissen und Gewissen der vollen Wahrheit entsprechen, und dass ich diese eidesstattliche Erklärung in Kenntnis dessen abgebe, dass wissentlich und vorsätzlich falsche Angaben gemäss Paragraph 1001, Absatz 18 der Zivilprozessordnung der Vereinigten Staaten von Amerika mit Geldstrafe belegt und/oder Gefängnis bestraft werden koennen, und dass derartig wissentlich und vorsätzlich falsche Angaben die Gültigkeit der vorliegenden Patentanmeldung oder eines darauf erteilten Patentes gefährden können.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

German Language Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den nachstehend benannten Patentanwalt (oder die nachstehend benannten Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt: (Name und Registrationsnummer antühren)

Thomas W. Speckman Regis. No. 22,617	Douglas H. Pauley Regis. No. 33,295
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Maxwell J. Petersen Regis. No. 32,772	Charles C. Kinne Regis. No. 31,631
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Mark E. Fejer Regis. No. 34,817	Kevin D. Erickson Regis. No. 38,736
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Nick C. Kottis Regis. No. 31,974	Roland W. Norris Regis. No. 32,799
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Eric T. Krischke Regis. No. 42,769	Melanie I. Rauch Regis. No. 40,924
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Telefongespräche bitte richten an:
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Douglas H. Pauley (847) 490-1400
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BEVOLLMÄCHTIGUNG DER ANWÄLTE, AUFTRÄGE UND INSTRUKTIONEN VOM VERTRETER DES ANMELDERS ENTGEGENZUNEHMEN UND AUSZUFÜHREN

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Voller Name des einzigen oder ursprünglichen Erfinders:

Claudia KIRCHNER 11.09.01
Unterschrift des Erfinders Datum

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POWER OF ATTORNEY: As a named inventor, I hereby appoint the following Attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. (list name and registration number)

Thomas W. Speckman Regis. No. 22,617	Douglas H. Pauley Regis. No. 33,295
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Maxwell J. Petersen Regis. No. 32,772	Charles C. Kinne Regis. No. 31,631
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Mark E. Fejer Regis. No. 34,817	Kevin D. Erickson Regis. No. 38,736
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Eric T. Krischke Regis. No. 42,769	Melanie I. Rauch Regis. No. 40,924
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AUTHORIZATION OF ATTORNEYS TO ACCEPT AND FOLLOW INSTRUCTIONS FROM REPRESENTATIVE

The undersigned to this declaration and power of attorney hereby authorizes the U.S. attorneys named above to accept and follow instructions from

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as to any actions to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. attorneys and the undersigned. In the event of a change in the persons from whom instructions may be taken, the U.S. attorneys will be so notified by the undersigned.

Full name of sole or first inventor:

Claudia KIRCHNER 11.09.01
Inventor's signature Date

Residence

Markgröningen, Germany
Citizenship

Germany
Post Office Address
Am Mühlberg 45
D-71706 Markgröningen, Germany

VERIFIED STATEMENT CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) & 1.27(d))-SMALL BUSINESS CONCERN
Docket Number
VO-537
Applicant or Patentee: Claudia KIRCHNER

Serial or Patent No.: _____

Filed or Issued: _____

Title: MILK SUCKING PUMP

I hereby declare that I am

- ☐ the owner of the small business concern identified below:
- ☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN KaWeCo GmbHADDRESS OF SMALL BUSINESS CONCERN Gerlinger Strasse 36/38D-71254 Ditzingen, Germany

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.12, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

- ☒ the specification filed herewith with title as listed above.
- ☐ the application identified above.
- ☐ the patent identified above.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights in the invention must file separate verified statements averring to their status as small entities and that no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern or organization having any rights in the invention is listed below:

- ☒ no such person, concern or organization exists.
- ☐ each such person, concern or organization is listed below:

Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING Mr. Hansjörg KirchnerTITLE OF PERSON IF OTHER THAN OWNER General ManagerADDRESS OF PERSON SIGNING Gerlinger Strasse 36/38, D-71254 Ditzingen, Germany

SIGNATURE

DATE 11. 09. 2001